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MAR. 1, 1954

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March 1, 1954 — Vol. 60, No. 9

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Table of Contents on Page 8

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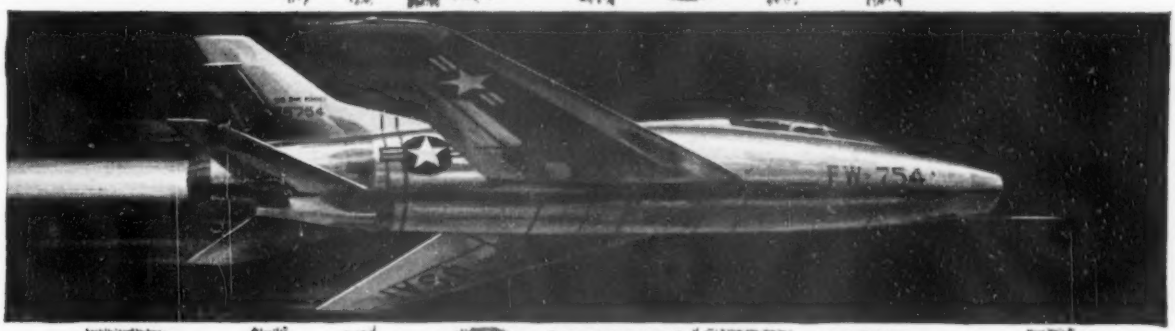

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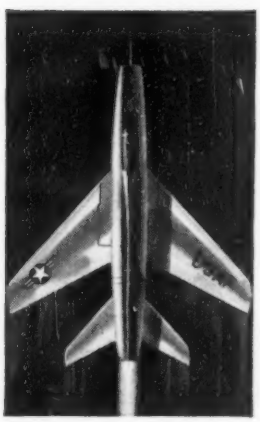

MACH (pronounced "mock") is a term you'll be seeing more and more since it is the only really accurate way of evaluating jet plane speeds. The need for this special standard of measurement is due to the fact that the speed of sound varies with changes in temperature and altitude. At sea level, for instance, sound travels at speeds ranging from 735 MPH at an air temperature of 60° to 800 MPH at 100°. However, using the Mach numbers, a jet traveling at Mach 1 is flying at the speed of sound, no matter at what altitude or temperature. Far advanced beyond any fighter now in production, the F-100 Super Sabre was designed and built by North American to meet our nation's need.

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NEWS DIGEST

Domestic

Fairchild Engine & Airplane Corp. has purchased all of the outstanding capital stock of American Helicopter Corp. of Manhattan Beach, Calif., and Mesa, Ariz. American Helicopter is engaged in research and development programs that will be continued by Fairchild.

Rem-Cru-Titanium, Pittsburgh, is cutting prices 14% on bars, billets, sheet and plates, expects price reductions on other products in the future. Cuts follow a 12% slash made by Titanium Metals Corp. last month (AVIATION WEEK Feb. 22, p. 17).

Super Constellations, powered by Wright Turbo Compound engines, set three new records during their introduction on Eastern Air Lines routes, Lockheed Aircraft Corp. reports. The records: EAL's order for 16 transports was filled in 16 weeks; Super Connies were placed in service on an average of four days after delivery; airliner flew from New York to Miami in 2 hr. 29 min., more than an hour under scheduled time.

Jet transports would be banned at New York's La Guardia and Idlewild International Airports if the state legislature passes a bill introduced by Sen. Seymour Halpern. The Queens Republican says he sponsored the proposed legislation at the request of spokesmen for 50,000 families in the area.

Chance Vought Aircraft has started delivering F7U-3 Cutlass fighters to the Navy for fleet operation.

Beech Aircraft Corp. has delivered the 1,000th twin-engine model D18S executive transport produced at its Wichita plant since 1945. The plane was purchased by Ohio Oil Co., Findlay, Ohio. Twelve Beechcraft Mentor trainers also have left the plant on a 6,000-mi. delivery flight to Chile, first of a million-dollar-plus production order from Chilean air force.

Multi-million-dollar contract has been awarded General Electric Co. by Consolidated Diesel Electric Corp. for production of electrical systems to be used on self-propelled powerplants for starting, servicing and towing USAF jet aircraft.

Harold Budds, engineering consultant for United Aircraft Corp.'s Hamilton Standard Division, founder of Budds Aero Castings and former vice president and general manager of Fairchild Engine & Airplane Corp. at Farmingdale, N. Y., died Feb. 19 at Windsor Locks, Conn. He was 50.

Pakistan Gets First Super Connie

Pakistan International Airways' first Lockheed Super Constellation is seen taking off from Burbank, Calif. The Pakistan Super Connie will carry 74 tourist-first-class passengers on flights between Dacca, East Pakistan, and Karachi, West Pakistan; 59-63 on luxury service Dacca-Karachi-Damascus-London.

Raymond C. Thompson, assistant secretary of Aero Associates, insurance underwriter, and one-time chief of Vermont's aviation department, died last month at Hasbrouck Heights, N. J.

Financial

American Airlines had a net income of $13,413,051 last year, compared with $12,514,405 in 1952. Revenues climbed to a record $208.3 million, an increase of $21 million over the previous year's $187.3 million. Operating expenses totaled $180 million, higher by $19.9 million than 1952. American has declared a 15-cent dividend on common capital stock, payable Mar. 20 to holders of record Mar. 5, and a regular quarterly payment of 87.5 cents on $3.50 cumulative convertible preferred stock, payable Mar. 1 to holders of record Feb. 25.

Ryan Aeronautical Co., San Diego, reports net income of $1,475,446 for fiscal 1953, an increase of 68% over the previous year's $878,359. Gross revenues totaled $50,167,693, compared with $34,975,214 for fiscal 1952. Backlog on Jan. 1, 1954: approximately $50 million.

Douglas Aircraft Corp.'s directors have proposed a two-for-one split of capital stock, will ask holders Apr. 21 to increase authorized shares from 2 million to 4 million.

Glenview Metal Products Co., Delanco, N. J., is offering 75,000 common shares and 75,000 shares of 8% cumulative preferred stock, plans to use the proceeds for certification, production and marketing its Flyride civil copter.

Rohr Aircraft Corp., Chula Vista, Calif., has authorized distribution of a 50% stock dividend Mar. 15 to shareholders of record Mar. 1.

International

British aircraft builders are expected to produce 130 commercial transports valued at $57.2 million this year, Society of British Aircraft Constructors reports. This will better by 10 the average of 120 planes a year since the end of World War II.

ICAO weather conference in Paris last week agreed to continue a modified North Atlantic reporting program until June 1956, plans to eliminate only one ship station.

Helicopter transport production is being studied by Brazil's aeronautical technical center at Sao Jose dos Campos. Project calls for a copter capable of lifting at least six tons or 40 passengers. Financing up to $2 million will be necessary to start production. Estimated price for each craft: $1 million.

RAF Canberra bomber is testing highspeed, high-altitude navigation devices in secret flights over the magnetic polar regions.

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The Aviation Week
March 1, 1954

Headline News

CAA Maps New 7% Personnel Cut..... 12
Air-to-Air Missiles for British Jets..... 13
Red Airpower 14
Wilson Sets Progress Payment Limit.... 14
PO Extends Surface Mail Flights..... 15
Aircraft Employment Remains High... 15
Panel Backs Federal Airport Aid..... 16
ARDC Shuffle 17
Jet Developments in Pictures..... 21
Three Fighters Bid for NATO Role.... 22

•

Aeronautical Engineering

AF Seeks Operational Data on Firebee. 29
IAS Summaries 30

•

Production

Plastics Find Wider Use in Tool Dies.. 40

•

Avionics

GE Builds Far-Seeing Air Radar..... 45

•

Equipment

New Hose Meets Jet Demands..... 48

•

Air Transport

Airlines Fight S&WA Cargo Deal..... 63
PAL May Drop Overseas Routes..... 64
NAA Would Give Up Registration..... 64
Russia Backs Red China Airline..... 65
Nonsked Fight 65
Canada Studies Copter Transport..... 67
Australian Pilots Ask Higher Pay..... 67

•

Editorials

Those Russian Pictures..... 78
Wanted: Millions of First Fighters.... 78

•

Departments

News Digest 7
Washington Roundup 9
Who's Where 11
Industry Observer 11
Production Briefing 44
Navy Contracts 44
Filter Center 46
New Aviation Products..... 59
Also on the Market..... 60
CAB Orders 68
Shortlines 76
Aviation Calendar 76

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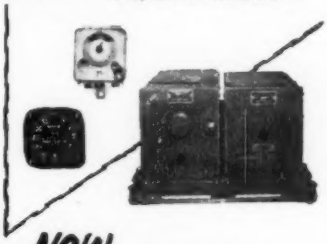

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Washington Roundup

"New Look" Opposition Grows

Congressional skepticism of the Administration's "new look" defense program, mostly among Democrats, is mounting. There are two major questions.

First, whether Democrats spearheading the move for bigger tactical naval and ground forces for "little wars" will join with Democrats insisting on more Air Force money.

• Leaders of the Army-Navy faction in the past have supported funds for USAF. They include Sens. Mike Monroney, Albert Gore and Henry Jackson. So far, their observations on the Air Force budget have been limited to pointing out that they opposed the $5-billion slash in the USAF budget last year and criticizing the Administration for "turning a handspring" to primary reliance on atomic airpower.

The prospect is that if Sen. Stuart Symington, former USAF Secretary, decides to put up a fight for more airpower money, he probably will have the support of this faction.

• Democrats, dissatisfied that the fiscal 1955 budget implementing the "new look" doesn't provide enough funds for USAF, have been comparatively quiet. The first outburst was by Rep. Tom Steed who said:

"In spite of the highly publicized expenditures proposed for 1955, which would appear to indicate increased emphasis on airpower, the appropriations proposed place less emphasis on airpower. . . . The 1955 budget proposed by the President gives no real priority to the mission of the Air Force . . ."

This group is reluctant to support the bigger-Army advocates. Symington commented: "I think more of the desirability of the new military budget—commonly termed 'the new look'—than do some of my colleagues."

Democrats of both factions are demanding "a new look at the new look" or "a thorough look instead of a new look"—pointing to long debating on defense at this session.

The second major issue is whether the Joint Chiefs of Staff will give qualified endorsement to congressional moves for increases in the service budget.

• Army's Chief, Gen. Matthew Ridgway already has made it clear in Senate testimony that he is "not in complete accord" with proposed Army reductions.

• Chief of Naval Operations, Adm. Robert Carney, in public speeches, has pointed to the possibility of a nuclear stalemate in a future war, as has been the case with bacteriological and chemical warfare, and emphasized the necessity of adapting defense to meet many types of warfare.

• USAF's Chief of Staff, Gen. Nathan Twining, in closed Senate sessions, however, has strongly supported the "new look" program.

New CAA Post

Civil Aeronautics Administrator Fred B. Lee has created the post of Administrator for Operations and appointed John M. Beardslee, former Director of the Office of Federal Airways, to the job. Beardslee will be responsible for all CAA operating programs and will represent the administrator in the aviation safety, federal airways, and airport areas.

Creation of the new post abolishes the job of executive assistant to the administrator, held by Morwick Ross, who is resigning Mar. 1 to join Northrop Aircraft, Inc. Joseph H. Tippets, deputy director of the Office of Federal Airways, succeeds Beardslee as director of federal airways.

Senator's New Resolve

Sen. Edwin Johnson's series of questions to CAB member Hamar Denny suggesting possible party-line voting by the Board and influence on Board actions by the Commerce Undersecretary for Transportation has caused numerous inquiries (AVIATION WEEK Feb. 8, p. 85).

The senator will not say who drew up the questions and gave them to him. "In the future, though," he says, "anyone who wants me to ask questions for them will have to agree to have their identity known."

USAF Efficiency Move

All Air Force depots will be on a cost accounting basis by April. The two main aims of the fiscal change: (1) Tighter inventory control, eliminating unnecessary procurement of spares and parts and other equipment; (2) comparison of the operating costs of various depots.

The changes are being accomplished under the direction of Assistant Secretary H. Lee White, in charge of budget matters. Previously, depot inventories were kept only on an item basis. It is hoped the new system will climinate item shortages as well as over-supplies.

Renewal of Renegotiation

Congress appears set to renew the renegotiation law in the immediate future, and make it retroactive to Jan. 1. The law expired Dec. 31. This had little significance, however, since it would take the Board two or three years to review contracts in process up to Dec. 31.

The retroactive provision will make contracts negotiated since that date to the present subject to renegotiation. The renewal measure has passed the House, cleared Senate Finance Committee, and is awaiting Senate approval.

More Army Airlift?

Chairman Leverett Saltonstall of the Senate Armed Services Committee, the Administration's key defense spokesman on Capitol Hill, said in a floor speech that one of the main aspects of the "new look" program is "improved ability of our Air Force to transport our armed forces."

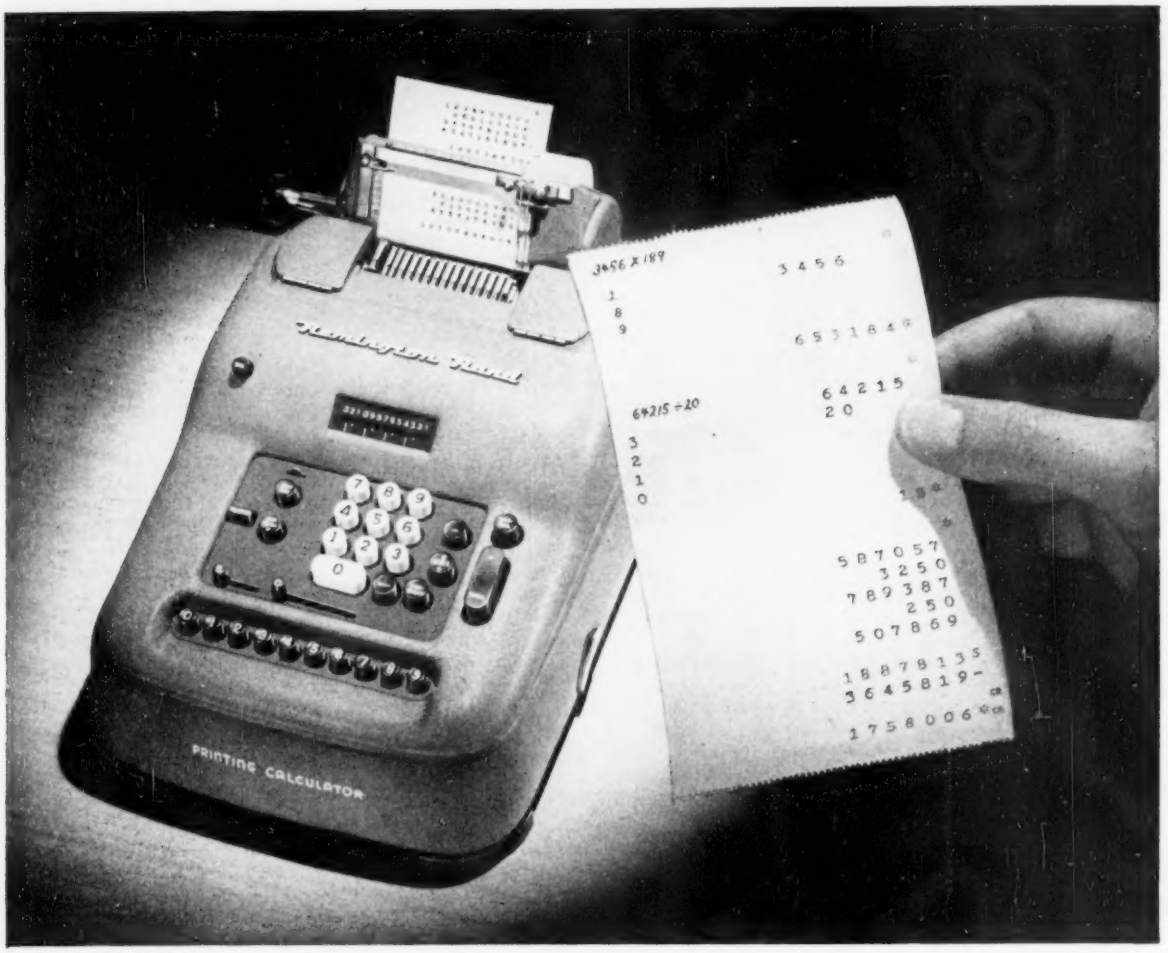
The "new look" reduced the 17 airlift wings provided in the 143-wing program to 11. Observers are puzzled by Saltonstall's statement.

Hinshaw Attacks PO

Rep. Carl Hinshaw is championing the cause of the regional air carriers. He recently attacked Post Office Department for its policy of giving mail contracts to the major low-rate airlines.

Postmaster General Arthur Summerfield's policy is keeping the Post Office budget down, he points out, but in the end adds to the subsidy which CAB must pay the smaller, higher-rate airlines. He charged that such tactics can "ruin suppliers (of air transportation) by causing them to bid against each other."

—Washington staff



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WHO'S WHERE

In the Front Office

David A. Thomas is new board chairman and executive director of The Babb Co., Newark, N. J.

Leland Glasgow has been elected vice president and comptroller of American Airlines. Other new officers: **Paul G. Larie,** treasurer; **Marvin Whitlock,** vice president-maintenance and engineering; **M. G. Beard,** vice president-equipment development. Elected to different jobs: **R. E. S. Deichler,** vice president-customer service; **L. G. Fritz,** vice president-flight; **G. J. Brandewiede,** vice president-purchasing and stores; **Walter Johnson,** vice president-properties; **William Littlewood,** vice president-research.

C. G. Adams has become vice president-finance and secretary of Braniff International Airways. Also promoted: **Rex Brack,** vice president for traffic and sales; **R. V. Carleton,** vice president-operations; **Malcolm Harrison,** vice president-personnel; **Walter M. Henshel,** vice president-public relations; **V. A. Kropff,** assistant vice president-executive projects; **Oscar Crane,** treasurer; **Horace Bolding,** director of purchasing and stores.

Dr. Charles J. Breitwieser, manager of Lear's General Development and Engineering Division at Los Angeles, has been elected a vice president.

George Friedl, Jr., has been appointed vice president-manufacturing at Link Aviation, Binghamton, N. Y.

Frederick H. Rohr, Jr., is new assistant vice president of Rohr Aircraft Corp., Chula Vista, Calif.

Changes

Prof. Theodor Buchhold, who helped develop Germany's V-2 guided missile, has joined Ford Instrument Co. at Long Island City, N. Y., as staff consultant to the vice president-engineering.

William L. Smith has become general manager of Fairchild Engine & Airplane Corp.'s Speed Control Division, Wickliffe, Ohio.

G. Russell Tatum has been promoted to general manager of Vitro Laboratories, Silver Spring, Md., and West Orange, N. J., division of Vitro Corporation of America.

Howard L. Hartman, former vice president of United Aircraft Service Corp., has been appointed general sales manager for Aircraft Engine & Parts Co., New York.

James O. Johnson has been named general sales manager of Buchanan Electrical Products Co., Hillside, N. J.

Robert S. Kelly has been appointed manager of security and communications for Ford Motor Co.'s Aircraft Engine Division, Chicago.

Honors and Elections

Ralph J. Cordiner, president of General Electric Co., and **James L. Myers,** board chairman and president of Clevite Corp., last week received Stevens Institute of Technology's annual Stevens Honor Award for "notable achievement" in their fields.

INDUSTRY OBSERVER

► North American F-86D all-weather Sabre interceptors are scheduled to be put through a major modification program beginning next month at NAA's Fresno and Inglewood, Calif., plants. Modification program also will involve Hughes Aircraft, Lear and General Electric, indicating the fire-control equipment, autopilot and jet engines are involved. Program is scheduled to run 18 months.

► Sikorsky has rolled out its first S-58 anti-submarine warfare helicopter on the ramp of its Bridgeport, Conn., factory. The S-58 is essentially an enlarged version of the S-55 and is scheduled for production for the Navy.

► Hughes Aircraft's Falcon air-to-air missile is making extensive use of glass-fiber-reinforced phenolic plastic that is able to withstand 500-deg. temperatures. Plastic is used in the Falcon's fuselage, wing and stabilizer, thus conserving considerable strategic material. Most of the plastic construction for the Falcon will be handled by a few West Coast molders.

► Bell Aircraft Corp. vertical-takeoff fighter prototype being built under USAF contract was damaged by a fire on the ground at the Buffalo plant. The Bell VTO is reported to use a turbojet in contrast to the turboprop powerplants on Navy VTO fighters being built by Lockheed and Convair (Aviation Week Feb. 15, p. 15).

► Office of Defense Mobilization has approved accelerated tax amortization on 80% of the $46-million order of Lockheed Super Constellations by Trans World Airlines. This is part of ODM's policy to increase potential military airlift by encouraging expansion of commercial airline fleets.

► North American board chairman J. H. (Dutch) Kindelberger told the California Junior Chamber of Commerce that his firm has already "built and tested rocket powerplants capable of delivering over a short period of time jet horsepower substantially greater than the total power output of the Hoover Dam." U. S. Department of the Interior says the Hoover Dam generates a maximum of 1,742,000 hp.

► Atomic Energy Commission reports that its principal contractors in the aircraft reactor field are General Electric Co. through its aircraft nuclear propulsion department at Evendale, Ohio; Carbide and Carbon Chemicals Co. through the Oak Ridge laboratory, and United Aircraft Corp. through its Pratt & Whitney Aircraft Division. USAF is sponsoring airframe research and development for a nuclear-powered plane with Boeing, Convair and Lockheed.

► An anti-personnel missile named Lazy Dog has been developed and tested at Air Force Armament Center, Eglin AFB, Fla. Missile resembles a tiny bomb, is only a few inches long. It would be used from low-flying aircraft against troop concentrations. Idea dates back to World War I when French dropped fluted steel darts on German cavalry units.

► Plugging its case for the pod-mounted jet engine, Boeing Airplane Co. says a four-man crew of company mechanics did a complete engine change on a General Electric J47 turbojet in a B-47 pod in only 19 min. 45 sec. Similar type of engine change for a Wright R3350 piston engine on a Boeing B-29 takes 4 hr.

► American Airlines may soon test a Collins arbitrary-course computer and automatic punch card attachment aimed at simplifying Great Circle navigation on DC-7 nonstop coast-to-coast flights. The 33-lb. device operates from two omnirange receivers, provides distance as well as heading information (Aviation Week Dec. 15, p. 41).

► Watch for a revival of the Navy design competition for a convertiplane grossing less than 10,000 lb. aimed at use by the Marine Corps. Original competition was scrapped because none of the entries could get under the 10,000-lb. weight limitation.

► Sncaso, French aircraft manufacturer, is pushing construction of two S.O. 9050 prototypes of a supersonic interceptor. This new design has been developed from the S.O. 9000 Trident now flying in France.

AVIATION WEEK VOL. 60, NO. 9 MARCH 1, 1954

CAA Programs New 7% Cut in Personnel

- **Extent of slash depends on 1955 appropriation.**
- **Commerce testifies it will not push airway charges.**

By Katherine Johnsen

Civil Aeronautics Administration has programmed a 7% personnel reduction in fiscal 1955 from the fiscal 1954 level, which would mean elimination of 1,148 positions.

Whether the reduction for the year starting July 1 is more or less than planned by CAA will depend on congressional action on its appropriation. CAA has requested a $103.8-million budget. This is $34.8 million below the fiscal 1954 and $45.2 million below the fiscal 1953 budgets.

These details were developed in hearings before the House Appropriations Commerce Subcommittee:

• **CAA is cutting** its personnel force in fiscal 1954 to 6% below the fiscal 1953 level. This involves elimination of 1,060 positions and a reduction in the total CAA staff from 17,094 to 16,034.

• **The reduction** to a total force of 14,903 planned for fiscal 1955 is slightly sharper. Seventeen positions would be added for maintenance of Alaska airports, making a net reduction in the total force of 1,131 positions.

Other highlights developed at the CAA budget hearings:

• **Commerce Department** will not promote a program to impose user charges for the federal airways.

Undersecretary for Transportation Robert Murray declared:

"We are not proposing anything." He explained: "We have made a study which . . . identified the cost as between the various users. It would seem to us that what was done with that was a legislative prerogative which . . . the Congress would make a determination on, as to what they desire to do . . ." (AVIATION WEEK Feb. 8, p. 83).

Rep. John Rooney, ranking Democrat on the subcommittee, countered:

"This is highly unusual. . . . It is the responsibility of the department to make recommendations to the Congress. You do not just put the pot of stew on the table and let everybody pick it apart."

• **Charges are to be levied** for airmen's certificates and increased for certification of aircraft.

Revenue from certification now approximates $175,000 a year, compared with a cost for the service of $600,000. Murray said a system of charges is to be instituted "which is calculated to return revenues at least equaling the cost of the services provided."

• **The door is not closed** on federal aid for new airports in fiscal 1955.

Murray said: "It will take several more weeks" for Commerce to digest studies before it and to decide whether federal money should be used for this purpose. He added that "if we do go ahead with it and if we do require funds we will come to you at that time."

Later, CAA Administrator Fred Lee said it is "perfectly possible" CAA will request additional 1955 fiscal money for federal airport aid.

(The Administration has asked for $600 million in new authorization to help finance highway construction.)

• **Incorporation of airports** as self-sustaining businesses, under local management, figures in Commerce Department plans. The department already has recommended legislation incorporating Washington National Airport to the Bureau of the Budget, and is in favor of incorporating the Anchorage Airport and Fairbanks Airport and turning their operation over to the territorial government.

"Our feeling is that logically an airport operation is a local municipal responsibility, that the federal government should not concern itself with local airport operation except in special cases, such as the Washington National Airport," Lee testified.

• **The trend** to take CAA out of fields which industry is capable of taking over will continue, Murray said. He itemized CAA efforts in this direction:

Turning inspections and other air safety functions over to industry; letting industry take over the "very large" education program CAA has conducted in the past; narrowing CAA's research interests in fields for which industry is better equipped; giving full responsibility to the Airport Operators Council for advising airport operators on management.

► **Fiscal Program**—Here are some details on CAA's fiscal 1955 program:

• **Operation of the federal airways.**

The Guam Overseas-Foreign Aeronautical Communications Station is being turned over to Navy and the Balboa Overseas-Foreign Aeronautical Communications Station to the Panama Canal Co.

Towers and interstate airways communications stations (INSACS) will be combined at 23 locations. This will involve combining the Washington Air Route Traffic Control Center and the communications station into one facility; combining the Miami and New Or-

Future Reductions in CAA Personnel

Here is a breakdown of cuts CAA plans to make in its personnel force in fiscal 1955, which starts July 1:

	Fiscal 1954 positions	Fiscal 1955 positions	Reduction
Sales and expenses	14,846	13,839	1,007
This includes:			
(1) Operation of the federal airways	11,657	11,069	588
(2) Aviation safety	1,630	1,454	176
(3) Airport development	51	36	15
(4) General counsel	53	45	8
(5) Aviation information	37	26	11
(6) Operation of aircraft	259	206	53
(7) Executive direction	55	42	13
(8) Staff and administrative	1,054	918	136
(9) Interfunctional	50	43	7
Establishment of air navigation facilities	831	775	56
Technical development	126	108	18
Federal-aid airport program	156	89	67
Maintenance, Alaska airports	65	82	(+17)
Air navigation development	10	10	....
Totals	**16,034**	**14,903**	**1,131**

leans and the San Francisco and Seattle Overseas Aeronautical Communications Stations, and a realinement of the Jacksonville and Miami Air Route Traffic Control Centers.

Facilities to be discontinued include 41 communications stations; 78 low-medium frequency radio ranges; three airport traffic control towers; standby engine generators at 575 locations.

For operation of new facilities, $971,795 is earmarked. These facilities include: instrument landing systems; surveillance radar; precision approach radar; compass locators; radio homing beacons; very high frequency omni-directional ranges; ultra high frequency communications; peripheral receiver transmitters; remote transmitters.

• **Establishment of air navigation facilities.** The largest single item is $2.3 million for 24 new very high frequency omni-directional ranges. Other CAA requests include: $880,600 for air traffic control towers and centers; $159,000 for aeronautical communications stations; and $86,000 for intermediate landing fields.

• **Air navigation development.** Although CAA has requested only $1,085,000 for this program to develop improved navigation and traffic control equipment, the Department of Defense expects to contribute $5 million, giving the Air Navigation and Development Board a $6,085,000 budget for the coming year.

• **Aviation safety.** CAA expects to eliminate 132 positions in aviation safety administration before the end of this fiscal year. It has not been decided where to make the additional reduction of 44 to make the 176 total reduction set for fiscal 1955. It has been decided to eliminate 75 regional and 43 Washington positions. Lee said that the reduced safety program is "adequate" in line with the reduced program for airways facilities.

• **Federal-aid airport program.** CAA plans to eliminate all district offices. About $75,000 on hand is earmarked for administering projects already underway.

• **Fewer automobiles.** CAA is making its $105,257 cut in "interfunctional" activities largely by reducing its automobile fleet by 60—from a total 710 to 650.

IATA Traffic Report

International Air Transport Assn.'s clearing house in London handled a record total of $241.6 million in traffic transactions between the world's airlines in 1953, Sir William P. Hildred, director general of IATA, reports.

Turnover in the clearing house was more than 19% greater than in 1952, Sir William says. Figures of the last five months of the year "reflect an upsurge in volume of interline business in air transport."

Air-to-Air Missiles for British Jets

(McGraw-Hill World News)

London—Hawker Hunters and Supermarine Swifts, coming into service with Royal Air Force this year, are scheduled to be equipped with air-to-air guided missiles that will quadruple the jet fighters' killing potential.

The British Ministry of Defense announced this intention last week in a white paper discussing U. K. defense policy. Air-to-air weapons, not yet in production, will be the first products of Britain's missile program.

Surface-to-air guided weapons will come next.

▶ **Test Developments**—Air Minister Lord de L'Isle and Dudley claims weapons testing at Australia's Woomera Range foreshadowed the most important developments in air defense since radar was invented.

"First of these weapons," he says, "will be launched from piloted fighters. They will eventually replace aircraft cannon."

The Air Minister also reports RAF's budget this year will reflect stockpiling of atom bombs for the first time.

▶ **Research Aircraft**—The white paper also announced Britain will have its first highspeed research aircraft flying in the next 12 months. The announcement says the aircraft's speed "will well exceed that of sound" but mentions no other details.

Several manufacturers are said to be working to such a specification. No airframe yet has been announced for the very powerful de Havilland Gyron jet.

▶ **Bomber Buildup**—Looking ahead in defense policy, the paper says: "Still greater emphasis will have to be placed on the Royal Air Force because of the need to build up a strategic bomber force and because of the importance of guided missiles in air defense."

The British argue they need a strategic bomber force because, "from our past experience and current knowledge, we have a significant contribution to make both to the technical and to the tactical development of strategic airpower."

▶ **Hopeful Policy**—Again this year British defense policy is more hope than actuality.

Considering that there will be less U. S. military aid this year, total defense spending will increase some $288 million to a total of nearly $4.6 billion.

But RAF's share actually is dropping off: $1.5 billion, or a few million less than last year. Reason: Spending on RAF installations and procurement of electronic equipment is less this year than last. Spending on complete aircraft and armament, including atom bombs, will be higher this year because of quantity deliveries of Hunters and Swifts plus first deliveries of Valiants.

▶ **Hunters Delayed**—Supermarine Swifts, due in service last June, started coming into service last month. Hawker Hunters, due in service last fall, have been seriously delayed.

Delays were caused "primarily by technical difficulties in development and design which emerged in the later stages of development and flight testing and led to the holding up of clearance of the aircraft for service use," says the white paper.

The British press has noted engine surging and lack of dive brakes (on the Hunter) specifically.

▶ **Indispensable Aid**—U. S. aid still is indispensable to the RAF buildup.

"It is hoped," says the white paper, "that the U. S. will be prepared to continue their assistance to the Royal Air Force in the form of aircraft and other equipment purchased in the United Kingdom under offshore purchase arrangements."

This apparently is a reference to a British request, forwarded last August, for $210 million in direct financial aid to the RAF production program. This request, half of which would come out of funds already appropriated by Congress, is under discussion at the Pentagon.

▶ **Political Principle**—If the request is granted, the money will have to be administered partly as "offshore purchases." This would establish a principle that, politically, U. S. officials want to avoid. It would mean financing through the offshore purchase program British aircraft for British use.

This principle has been established in France already with the Dassault Mystere, in which the U. S. invested $86 million last year. The Mystere will go to the French.

But so far, on the surface, purchases of aircraft in Britain have been for either third countries or to replace promised shipments of U. S. aircraft. In the latter case, the U. S. bought "offshore" $13 million worth of Hawker Sea Hawks last year to substitute for a shipment of Douglas Skyraiders promised to the U. K. but diverted elsewhere.

▶ **Undecided Order**—The $140-million order that the U. S. placed "offshore" for Hawker Hunters in the U. K. last year is, at present up in the air. Some 468 aircraft are involved but no one has decided who will get them.

Originally, it had been believed these Hunters might form the nucleus of a new German air force. The idea still is very possible. RAF maintains it is over and above minimum requirements for Hunters, but RAF still could use them.

—N. McK

Red Airpower

- **High federal officials study bombers pictures.**
- **Aviation Week report stirs Senate, House.**

AVIATION WEEK's exclusive photographs and story on two new intercontinental Russian bombers (Feb. 15, p. 12) are receiving priority attention in the highest government councils.

Developments include:

• **President Eisenhower** and the National Security Council were shown the AVIATION WEEK article and pictures by Allen Dulles, director of the Central Intelligence Agency.

• **Rep. Samuel W. Yorty** in a House speech called for Defense Secretary Wilson's resignation for underestimating Russia's intercontinental bomber potential.

• **Editorial comment** was sparked by the revelation of existence of the Russian bombers. One of the first editorials appeared in the influential Washington Star.

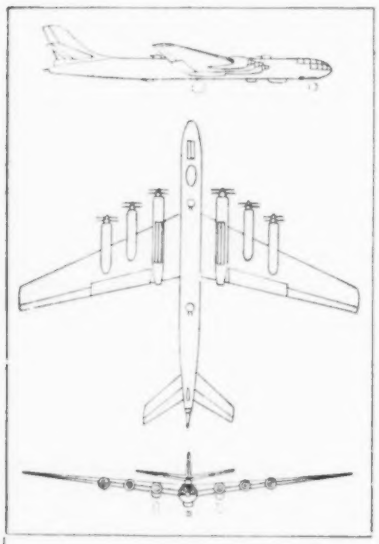
• **Sen. Stuart Symington**, following a Senate speech on the subject (AVIATION WEEK Feb. 22, p. 13), inserted the AVIATION WEEK article in the Congressional Record.

▶ **Timely Warning**—The Star editorial stated: "Sen. Stuart Symington has done a timely thing in warning against the danger of underestimating the Soviet Union's engineering and producing ability in the field of long-range strategic bombers. He has been moved to do this by fresh indications—in the form of an article and two photographs in the magazine AVIATION WEEK—that the Russians are making further inroads on the air superiority of the United States.

". . . Because of his experience as Air Force Secretary from 1947 to 1950, Mr. Symington speaks with enough authority to be listened to when he warns the country not to underrate the Russians and their stategic bombing potential.

"After all, since they are capable of producing atomic weapons and the hydrogen bomb, it is simple common sense to assume that they are sparing no effort to build the planes needed for long-range delivery."

Secretary Wilson canceled his press conference last week, just as he did the week before.



Tupolev 200

Max. speed	465 mph.
Service ceiling	50,000 ft.
Wingspan	236 ft.
Overall length	200 ft.
Crew	14

Powered by six 4,850-eshp. turboprop engines.

Ilyushin 38

Max. speed	480 mph.
Service ceiling	50,000 ft.
Wingspan	168 ft.
Overall length	132 ft.
Crew	8

Powered by four 4,850-eshp. turboprop engines.

These first authentic three-view drawings show the Tupolev 200 and the Ilyushin 38, newest Russian turboprop bombers in squadron service. Together with the first photographs of the big bombers, they were turned over to intelligence experts of the USAF before publication in AVIATION WEEK.

Beech Lists Salaries, Comments on Cutbacks

O. A. Beech, president of Beech Aircraft Corp., received $96,300 during fiscal 1953 ended Sept. 30, the firm reports to Securities & Exchange Commission.

Other officers salaries: John P. Gaty, vice president and general manager, $69,149; Frank E. Hedrick, vice president and coordinator, $66,416; and T. A. Wells, vice president and chief engineer, $45,388. The firm paid a total of $362,165 to its officers during the year.

▶ **Backlog Halved**—Mrs. Beech, widow of company founder Walter H. Beech, says Beech cancellation of the Air Force T-36 contract set back the equivalent of an entire year's production and eliminated half of Beech's backlog. At year's end, the backlog stood at $102,080,000 (AVIATION WEEK Feb. 22, 1954).

Management "never has and never will express any criticism of government's action," she says. "The interests of the government are paramount and no contractor has any legitimate reason for complaint."

▶ **USAF 'Always Right'**—The T-36 was Beech's biggest contract with the government, the firm's president says, but "the customer is always right." Cancellation of the contract June 10, 1953, after more than two-thirds of fiscal 1953 had elapsed, helped bring about a net loss of $2,321,052 for the year.

Beech also halved the number of employes at the peak level of the year. The firm had 6,867 employes on Sept. 30.

Wilson Sets Limits On Progress Payments

Progress payments to defense contractors should not exceed 90% of direct labor and material costs—or 75% of total costs—of work to be done on the undelivered part of the contract, according to Defense Secretary Charles Wilson.

"It is not and has not been the policy of the Department of Defense that the proper use of progress payments should be stopped or unreasonably curtailed," he says. ". . . However, contract provisions for progress payments should be only supplementary to private financing, including guaranteed loans, in amounts reasonably necessary for contract performance."

Aircraft Industries Assn. says the directive should prove helpful to the industry. AIA points out that administrators at the lower level of the services interpret regulations strictly and that the Wilson memorandum permits

a more liberal administration of progress payments.

▶**Approval Needed**—Wilson notes that lesser percentages often may be adequate, and ruled that higher percentages necessary in individual cases will require the specific approval of the head of a procuring activity or of a general or flag officer.

"The percentage rates and cost bases for progress payments on new procurement should be determined on a minimum basis commensurate with the contractor's production schedule requirements and minimum inventory lead time, with due regard to the contractor's projected cash needs, cash resources and their planned application," Wilson adds.

▶**Notify Contractor**—Wilson says progress payments require careful administration to insure against overpayments and losses.

"In the process of reviewing individual progress payments already existing or hereafter established," he points out, "action to reduce or slow down progress payments or to increase liquidation rates, (unless justified on other grounds, such as overpayments or unsatisfactory performance), should be consistent with contract provisions, and never taken precipitately or arbitrarily.

"Any such reduction of progress payments on active contracts, with a view to holding all progress payments in line with actual reasonable necessity, should be effected only after notice to and discussion with the contractor . . ."

Post Office Extends Surface Mail Flight

Air transportation of first-class mail from New York, Chicago and Washington, D. C., to major cities in Florida was begun last week as part of Post Office Department's overall experiments on movement of surface mail by air.

Participating carriers are Delta-C&S, Eastern and National Airlines. Delta and Eastern provide service from Chicago to points in Florida, while National and EAL fly three-cent mail between New York and Washington and between points in Florida.

Service was initiated at request of the Postmaster General with Civil Aeronautics Board approval.

All mail will be carried on a space-available basis.

Rates to be paid by Post Office:

- **Delta and Eastern** from Chicago to Jacksonville, Tampa, Miami, 20.04 cents per mail ton-mile.
- **National and EAL** from Washington to Jacksonville, Tampa and Miami, 20.04 cents per mail ton-mile.
- **Eastern and National** from New York-Newark to Jacksonville, Tampa, Miami, 18.66 cents per mail ton-mile.

Aircraft Payrolls Remain High

Major West Coast plane builders expected to maintain force of 300,000 through '55; only NAA cuts back.

Continued strong employment in the West Coast aircraft industry is the general outlook of major plane manufacturers.

After a mild dip following peak Korean goals, employment level is up to more than 300,000 working directly in production of aircraft and parts, a level expected to continue into 1955, a survey by AVIATION WEEK reveals.

This forecast is based on a backlog of orders totaling more than $6.5 billion for development of supersonic fighters, missiles, research aircraft and other classified items.

Only one West Coast firm, North American Aviation, is planning a labor cutback of any size.

▶**Minimum Turnover**—Arthur E. Raymond, vice president-engineering for Douglas Aircraft Corp., says "diversification of output—airplanes and guided missiles for military and commercial customers—minimized the normal peaks and valleys in aircraft employment" at Santa Monica, El Segundo and Long Beach, Calif., plants.

Douglas presently employs 67,500, an increase of about 4,500 since early 1953.

This figure includes an all-time high of 23,340 persons at El Segundo, 10% greater than the World War II peak of 21,292.

The El Segundo Division plans to hire an additional 5,000 workers by the end of this year.

Raymond predicts: "At least over the next year or two it is to be expected that the present level of business in the Los Angeles aircraft industry will be maintained."

▶**2,000 Drop**—Lockheed Aircraft Corp. reports total employment at around 31,750 the first of this year. The company expects to ease down to about 29,500 by fall.

Burt C. Monesmith, vice president of the California Division, says Lockheed will be kept busy with a large order for military models of Super Constellations, new commercial Super Connie orders, development of the F-104 jet fighter prototype, turboprop C-120 transport prototype, and turboprop Super Constellations.

▶**Stable Work Force**—Boeing Airplane Co.'s present labor force in the Seattle area is approximately 37,500. The 707 jet transport prototype, first production models of the B-52 Stratofortress plus continued outlook of KC-97 Stratofreighters and classified projects indicate employment will remain relatively stable during the year, according to the company.

Ryan Aeronautical Co. forecasts its labor force will be around 4,000 at the end of 1954. An employment peak of 4,350 reached in July 1953, resulting from the Korean war buildup, has leveled off to the present force of 4,100.

▶**Near Peak**—B. F. Coggan, San Diego Division manager for Consolidated Vultee Aircraft Corp., says the present labor force totals 22,500, compared with a peak of 23,000 in 1953. Convair San Diego expects the present force to remain stable throughout 1954.

Northrop Aircraft has more than doubled its payroll since World War II. Currently Northrop employs 22,200 and, by the end of 1954 expects an increase of 1,000.

▶**NAA Cutback**—North American presently employs 53,375. The company has increased its payroll by about 3,400 during the past year.

However, by the end of 1954 NAA anticipates the present labor force will be reduced somewhere between 15 and 30%.

Accounting for such reduction, the company says F-86 production is nearing the final stage while the F-100 still is in the early phase of mass output for USAF.

Supersonic Tow

Bellanca Aircraft Corp. has developed an anti-aircraft tow target for supersonic, high-altitude runs.

The plastic, wingless, airframe-shaped XM-24—produced at Bellanca's New Castle (Del.) plant under an Army Ordnance contract—is undergoing flight tests at Eglin AFB, Fla.

The company indicates its new target is capable of being towed by USAF's fastest aircraft at altitudes of 40,000 ft. and higher in runs before Army's radar and gun crews. The craft is launched from a special cart and trails the tug more than 5,000 ft. by means of a special cable.

The XM-24 is 19 ft. long, weighs approximately 200 lb. and is constructed of a plastic designed to keep the target from shattering when hit by shell fragments. A parachute is installed in the target for recovery after its mission is completed. A special material in the fuselage assures flotation in water.

Panel Backs Federal Airport Aid

Transport council group finds government assistance is needed to maintain national defense requirements.

Financial assistance to state and local governments for construction of airports that are in the national interest is a federal responsibility, the airport panel of the Transportation Council unanimously has decided.

The recommendations will be reviewed by the Transportation Council, a Commerce Department advisory group composed of panels representing all forms of transportation. The council, in turn, reports its recommendations to Undersecretary of Commerce Robert Murray.

▶ **Disagreement**—The airport panel report is in disagreement with the Administration's policies. Funds for airport construction were not requested for fiscal 1954, and there is no request contained in the fiscal 1955 budget.

Sen. McCarran, author of the Airport Aid Act, has been sharply critical of the Administration's decisions on construction funds. The panel's report was released by McCarran as a Senate document.

▶ **Conclusions**—Panel's findings and conclusions include:

• Number and functional adequacy of present civil airport facilities do not meet present and future needs of civil aviation consistent with requirements of national interest and security.

• States, municipalities and other local political units alone are unable to carry the entire capital investment burden necessary to build and maintain an adequate system of national airports.

• The federal government should participate financially with state and local governments in the construction and development of civil airports to the extent that these facilities serve the national interest.

• The determination of whether there is sufficient national interest to warrant federal participation in a particular airport project should be based on a demonstration of tangible aeronautical necessity in the area served.

• Federal aid should not be limited to any class or category of airport or landing area.

• The following segments of airport development should be eligible for inclusion in federal-aid projects:

1. Aquisition of land or easements, including all areas necessary for the public safety, such as overruns, runway approaches, and land required for the expansion of aeronautical facilities.

2. Land development, such as clearing, grading, fencing and installation of drainage, sewer and water facilities. This should include not only the initial cost but also the cost of any subsequent modification or addition.

3. Construction of runways, taxiways (including leadoff taxiways) runup aprons, and ramps devoted to common public use. Hard surfacing or other paving should be provided where natural drainage will not assure all-weather service. Federal aid normally should be limited to development of a single runway on each airport.

4. Installation of lighting and navigational facilities (including lighting of obstacles in the approach area) for common public use for the safe operation of aircraft on the airport.

5. Removal of obstacles on approaches to airport runways when in the interests of public safety.

6. Nonrevenue service-type structures, such as buildings designed to house fire, crash and maintenance equipment; control towers.

7. Access and service roads within airport boundaries.

• Because terminal buildings are revenue-producing facilities, they should not receive federal grants-in-aid. However, as a corollary, all federal agencies should pay for all their space requirements, including construction and maintenance, on a self-liquidating basis.

• Congress should study the feasibility of a plan whereby the federal government would guarantee the payment to private investors, such as banks and other lending agencies, of indebtedness incurred by state or local governments for the construction of terminal buildings.

• The federal government should remove reservations and restrictions contained in surplus property deeds or airport sponsors agreements that prevent private financing of development.

• When military requirements at an airport exceed civilian needs, the additional cost should be borne in full by the Department of Defense.

• A thorough revision of the National Airport Plan should be made. This should be based on sound criteria designed to gage the tangible aeronautical necessity of the area served.

• Selection of sites for airports, heliports and seaplane bases to be included in the National Airport Plan should be the mutual responsibility of federal and state officials, with local officials.

• Preparation by the federal government of annual or biennial airport programs and the selection of individual airport projects to be included therein should be based on the applications of state and local officials.

• Except as provided in the Federal Airport Act and when specifically recommended by the Civil Aeronautics Administrator and approved by Congress, the share of the federal government in any approved project should not exceed 50%.

• Congress should review the Federal Airport Act, together with all other statutes affecting airports, in the light of experience gained since 1946, with the view to eliminating unnecessary costs and restrictions through amendments to the act or applicable statute. Pending such action by Congress, Civil Aeronautics Administration should review the act with a view to eliminating all unnecessary costs, restrictions, regulations, and requirements.

▶ **The Panel**—Members of the panel and their affiliations include: Jennings Randolph, chairman, assistant to president of Capital Airlines; Francis A. Bolton, president of American Association of Airport Executives and superintendent of Port Columbus Airport, Columbus, Ohio; Jean H. Dubuque, executive director and secretary of National Business Aircraft Assn., Inc., Washington, D.C.; J. D. Durand, secretary and assistant general counsel for Air Transport Assn., Washington; Joseph H. B. Hartranft, president of Aircraft Owners and Pilots Assn., Washington; Louis R. Inwood, past president of Airport Operators Council and director of aviation at International Airport, Philadelphia.

Other members are: Foster V. Jones, member of Airport Operators Council and director, Louisville and Jefferson County Air Board, Louisville, Ky.; A. B. McMullen, executive secretary of National Association of State Aviation Officials, Washington; Melvin H. Nuss, treasurer of American Association of Airport Executives and director, Municipal Airport, Reading, Pa.; Donald W. Nyrop, Washington counsel for Conference of Local Airlines, Washington; Thomas K. Taylor, vice president of Trans World Airlines, Washington; and R. W. F. Schmidt, manager of Tucson Municipal Airport, Tucson, Ariz.

Sen. Griswold Heads Aviation Subcommittee

Sen. Dwight Griswold has been named chairman of a standing aviation subcommittee of the Senate Commerce Committee. Other members: Sens. James Duff, Frederick Payne, Mike Monroney, and George Smathers.

The subcommittee does not appear to have much significance at this time, because hearings on the McCarran bill, the major civil aviation legislation up for consideration, will be held before the full committee under the chairmanship of Sen. John Bricker.

ARDC Shuffle

- **Letter gives new details of weapons buying.**
- **USAF headquarters to select contractors.**

By Robert Hotz

Further details on how USAF weapons system development will be handled as a result of the recent reorganization of Air Research and Development Command headquarters (AVIATION WEEK Feb. 22, p. 12) are included in ARDC Letter No. 80-1.

Principal points of interest to the aircraft industry:

• **Contracting** for general design studies on new weapons systems will be handled by ARDC headquarters through its procurement directorate. These general design studies are the first point of contact between industry and USAF on major new air weapons systems.

• **Selection** of a specific contractor to develop a weapons system will be made by USAF headquarters based on recommendations of ARDC and Air Materiel Command.

• **Development contracts** for weapons systems (Phase I including mockup) will be negotiated by AMC with the contractor selected by USAF headquarters. ARDC will monitor the contractor's work in executing the development program.

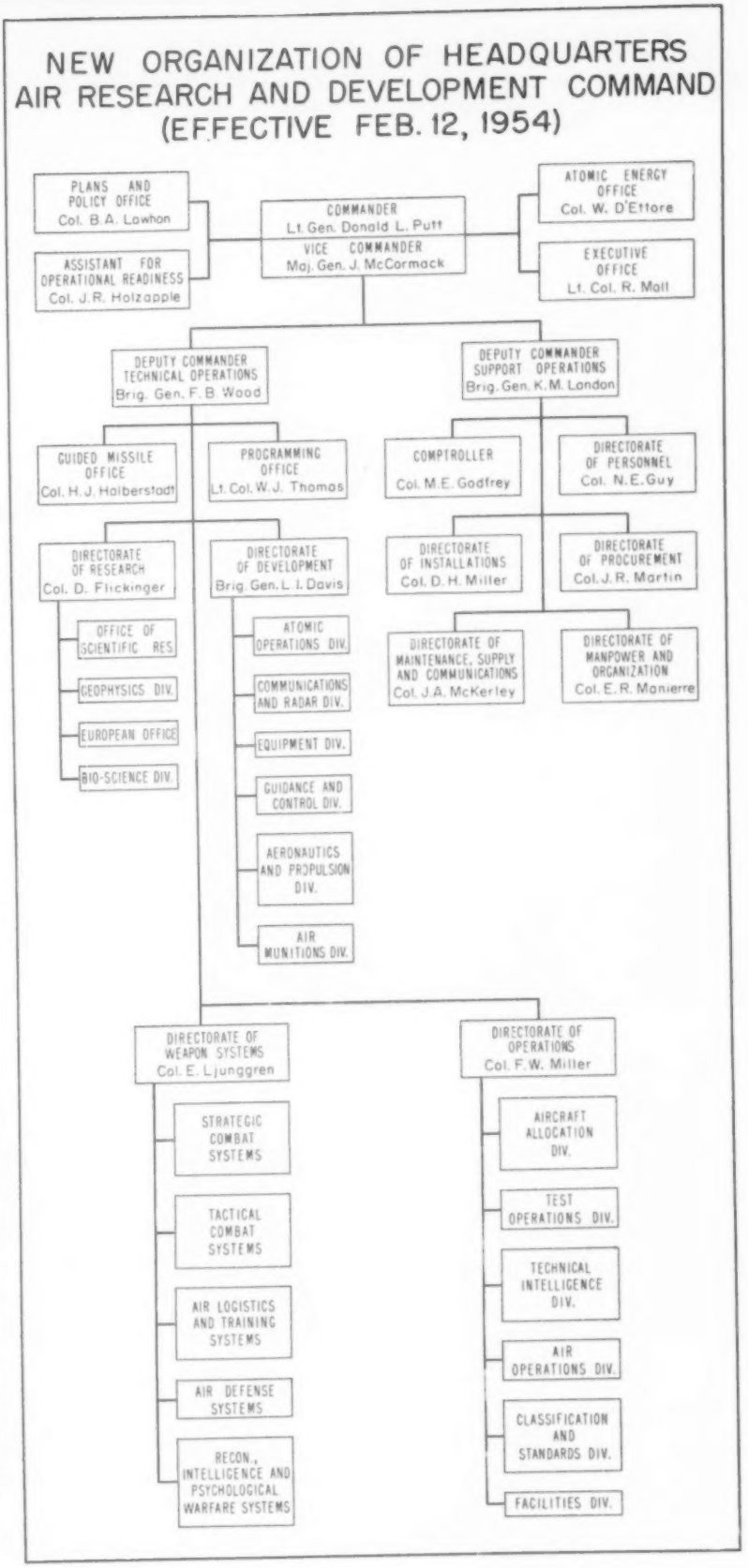
▶ **New Procedures**—Here in detail is how the new weapons system management will be handled under the revised procedures:

USAF headquarters will continue to act as the originating agency for all new weapons systems. It has the job of translating the specific combat missions assigned USAF by the Joint Chiefs of Staff into the weapons systems required to execute these missions successfully.

These requirements are stated in a general operational requirement (GOR) and a development planning objective (DPO) prepared by the Deputy USAF Chief of Staff for Development with the help of ARDC's Directorate of Weapons Systems. ARDC also is responsible for providing USAF headquarters with an index of weapons system capabilities with an availability time scale for each USAF mission.

Transmission of the GOR and DPO from USAF headquarters to ARDC headquarters triggers development of a specific weapons system. These documents come to rest in ARDC's Directorate of Weapons Systems where two initial appointments are made:

• **Project director** for the specific weapons system. He stays with the new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ASSISTANT FOR OPERATIONAL READINESS Col. J.R. Holzapple
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weapons system through the complete development cycle from inception to delivery of combat-ready equipment to USAF units. In practice, he also will head the joint project office established at Wright Air Development Center for each specific weapons system.

• **Technical committee,** comprising chiefs of appropriate technical divisions in ARDC headquarters (see chart).

▶ **Objectives**—The project director and the technical committee work together to accomplish the following objectives:

• **Prepare purchase requests** and work statements for contracts with the aircraft industry for general design studies. These general design studies, done by industry, are the basis for later selection of a specific contractor to do actual development of a weapons system. Contracting for these general design studies is handled by the ARDC Procurement Directorate headed by Col. J. R. "Bob" Martin.

• **Prepare design study** directives to ARDC centers specifically presenting the problem of the GOR to each center and directing them to support the aircraft industry in the preparation of general design studies.

The general design studies done by the aircraft industry are reviewed by the project director and the technical committee in ARDC headquarters to determine what kind of a weapons system it will be feasible to develop within the time limits specified by USAF.

On the basis of this analysis, a weapons system development plan is organized in coordination with ARDC's Director of Development, Brig. Gen. Floyd B. Wood; the Director of Research, Col. Don Flickinger and Air Materiel Command headquarters.

ARDC centers also are consulted in preparation of the development plan to determine that the state-of-the-art forecasts are well within the military capabilities required of the new weapons system.

▶ **Air Council Review**—The ARDC Directorate of Weapons Systems in coordination with the project director and the technical committee is then responsible for presenting the weapons system development plan to USAF headquarters and defending it before the air staff.

The Air Council of USAF headquarters reviews and approves the development plan, then issues a development directive to ARDC to proceed with development of the weapons system according to the USAF-approved development plan.

On receipt of the development directive from USAF, ARDC headquarters invites the aircraft industry to present specific design proposals, along with cost estimates, data on facilities required, producibility and maintainability adequate to meet the requirements of the development plan. ARDC issues these invitations to the aircraft industry through AMC headquarters.

The Weapons Systems Directorate in ARDC headquarters is charged with the responsibility of evaluating the specific design proposals submitted by industry on the following points:

• **Meeting development** plan requirements.

• **Producibility.** Can the system be manufactured in quantity within the time limits specified by USAF?

• **Maintainability.** Can the system be maintained and operated in the field within acceptable USAF limitations?

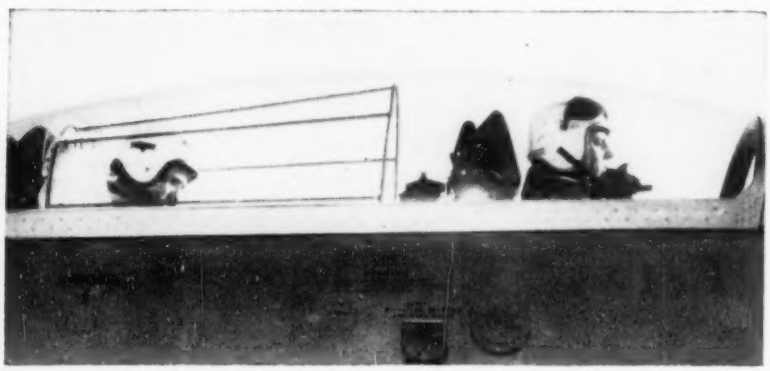
The first point is evaluated with the assistance of the ARDC directors of research and development and appropriate ARDC centers. The second and third points are evaluated in coordination with Air Materiel Command. The Weapons Systems Directorate selects the specific design proposals that fulfill development plan requirements and coordinates its selections with AMC.

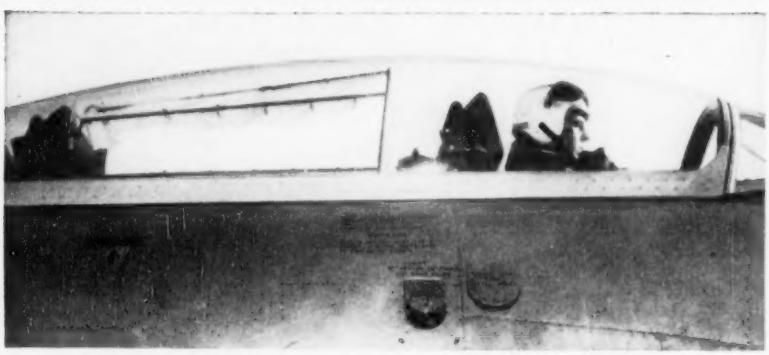
As many differences as possible between the ARDC and AMC recommendations are arbitrated before presentation of a joint submission to USAF headquarters. Decision on the joint presentation is made by USAF headquarters which then picks a specific contractor to handle the weapons system development and issues directives to ARDC and AMC to implement its decision.

▶ **JPO Focal Point**—At this stage the center of weapons system development shifts from ARDC headquarters to the ARDC center that will handle the development phase. Currently most weapons systems are handled at Wright Air Development Center.

The project director is transferred from ARDC headquarters to the appropriate center where he establishes a joint project office and begins liaison with Air Materiel Command on production and procurement problems. The JPO serves as the focal point for all contractors involved in a specific weapons system development program until it is in quantity production.

Currently all JPOs are located at Wright Air Development Center where they can maintain close liaison with both the technical laboratories of WADC and the headquarters of Air Materiel Command.





How RCAF Gives Blind Flight Training

A hood suspended from a wire framework over the rear cockpit of Royal Canadian Air Force's Lockheed T-33A jet trainers permits use of the planes for improving jet fighter pilot blind flying proficiency. The hood framework is attached to the lower section of the transparent canopy so that it is lifted out of the way when the canopy is raised or ejected. Top photo shows blind flying hood folded back; lower picture shows it extended for instrument flight. The T-33As are built by Canadair and are powered by Rolls-Royce Nene engines. USAF versions have Allison J-33-A-16A turbojets.

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Applying "machine age" technique to speeding up solution of cost accounting problems. Glenn Capps, Controller, discussing a problem with accounting machine operator.

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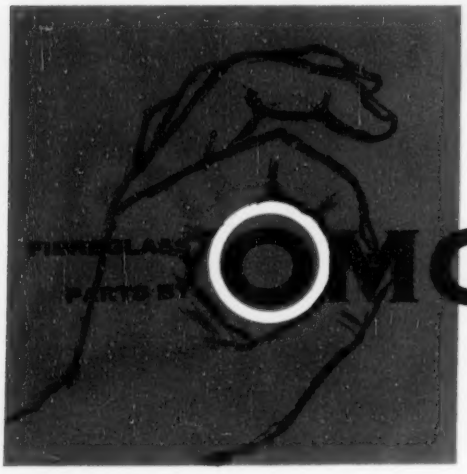

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NEW LOW-COST COPTER—Priced at $1,300-$1,500, this new craft was designed by Hugh Pentecost, president of Capital Helicopter Corp. at Schenectady, N. Y. The copter is powered by two Naval Research Laboratory 23-lb.-static-thrust pulsejets mounted at tips of 18-ft main rotor. Gross weight of the copter is 450 lb.; top speed is 90 mph., rate of climb 800 fpm. and endurance 1.5 hr.

Jet Aviation Developments In the News

NORTHROP ADOPTS "SPACE LOOK"—Two Northrop Scorpion jet fighter crew members, attired in USAF high-altitude suits that give them a "space man" appearance, examine a Scorpion's port rocket pod. The new suit is a combination T-1 high-altitude and anti-G garment with high-pressure breathing helmet and oxygen supply unit. The unusual shape of the helmet, which extends down over the neck and encloses the chin, is noteworthy.

SEA HAWKS LEAVE FOR EAGLE NEST—A squadron of Hawker Sea Hawk naval jet fighters prepares to take off from a British base to join HMS Eagle, Britain's largest operational aircraft carrier. Sea Hawks are powered by Rolls-Royce Nene.

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Three Fighters Bid for NATO Role

New Avro delta fighter, Folland Gnat and Sncase Le Baradour compete for ground attack contract.

By Nat McKitterick
(McGraw-Hill World News)

London—Last December Gen. Lauris Norstad's air staff at the North Atlantic Treaty Organization drew up a new operational requirement: an attack aircraft to support ground forces. Today competition for the NATO contract is fierce.

Upwards of 1,000 orders may be the prize for the manufacturers or manufacturers that win NATO (and U.S.) approval.

▶ **Big Claims**—In advance of a special Pentagon mission armed with a possible $50 million in grants to aid special weapons projects, three ardent competitors for the ground attack requirement are making big claims:

• **W. E. W. Petter,** designer of the Folland Gnat (FO141) light fighter, discloses that his original interceptor project is being plugged as a ground attack weapon.

• **Sir Roy Dobson,** chairman of A. V. Roe, Ltd., reports he has a new delta project, based on the performance capabilities of the Avro 707 series of research craft. He believes that the new project promises to be just what NATO needs.

• **France's Sncase** is sprucing up its Le Baradour dolly-launched fighter in preparation for inspection by the Pentagon visitors.

All three projects are private ventures. None has been ordered by the British or French governments concerned. The three manufacturers are primping like school girls at the prospect of attracting U.S. finance to their projects.

▶ **Development Fund**—Under last year's foreign aid budget, $50 million was earmarked for grants-in-aid to any weapons research projects in Europe that promised to aid NATO buildups. Under this broad term of reference, any or all of the "ground attack projects" are eligible for help.

But this money, if allocated here,

Javelin or F-86 for NATO?

(McGraw-Hill World News)

London—Pentagon officials are trying to decide whether offshore purchase money should be used to finance new orders for Gloster delta-wing Javelin fighters or North American F-86Ks, authorative sources here report.

Royal Air Force, already has ordered the Javelin in quantity, and Italy's Fiat last summer won a $22-million offshore contract to assemble 50 F-86Ks. But current orders for the Javelin and the F-86K make up only a part of NATO's requirements for all-weather fighters. Question now being studied in Washington, D. C., is how the remaining orders should be split.

▶ **Complex Competition**—Considerations entering into the all-weather competition are many and complex. Politics, foreign and domestic, are as important as technical and production considerations.

The British want U.S. financing to set up a second Javelin production line in the U.K. to supply NATO air forces. They contend the Gloster fighter is considerably in advance of the Sabre, has greater range and better performance at altitude, can carry more electronic gear and is two-place against the F-86K's single seat.

Cost of the Javelin, about $420,000, is more than the $400,000 price for F-86Ks produced in the U.S. But signs are that Sabres assembled in Italy are going to cost a lot more than the U.S. list price, perhaps as much as $1 million each (AVIATION WEEK Nov. 23, p. 17).

▶ **Sabre Edge**—The big advantage of North American's fighter is that it is a proven aircraft, already in quantity production in the U.S. While the first production Javelin has now flown (the fourth built, two of the first three crashed), models will not be coming off the Gloster line with any regularity before next fall.

Also in favor of the F-86K:

• Without Sabre production, the Fiat works at Turin—probably the most modern aircraft plant in Europe—will be out of a job. Italy has an excellent nucleus of skilled aircraft production labor that the West wants intact.

• The F-86K is the only U.S. aircraft so far to get offshore purchase funds. As such, it helps dampen political opposition in Congress to the idea of spending taxpayers' money to encourage the production of European aircraft.

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would be a grant for development costs, not be a commitment to buy any of the aircraft concerned. Such procurement can come only after USAF test pilots have flown and approved the prototypes in question.

For all practical purposes, this means that if any of these projects do flower, financial support will have to come from the British or French governments.

▶ **British Promotion**—The fact that the day of decision is many, many months away has not done much to quench the fires of competition, especially between Folland and Avro.

Both are offering "light fighter" projects, the Gnat with an all-up weight of approximately 6,000 lb. and the Avro project with around 9,000 lb. Both say their costs are "less than a third" of conventional interceptors, claim extra-speedy production processes, and cite performance in the transonic range—equal to that of conventional day interceptors.

The first prototype Gnat, considerably different than the proposed production model, is scheduled to fly next fall. The Avro project probably is about a year off.

▶ **French Lead**—With one prototype in the air and a second about to fly, Sncase is ahead of the British with Le Baradour. But in its ground attack role, Le Baradour will show an all-up weight of more than 15,000 lb., putting it outside of the British idea of light fighters.

Interest in Le Baradour has centered largely on its novel launching mechanism—a dolly, from which the aircraft is shot into the air with the help of Rato units (AVIATION WEEK July 27, p. 29).

▶ **Sample Tender**—Petter stole a promotional march on his competitors with the Gnat. It was the Folland designer who did much to persuade NATO airmen that an operational requirement for a ground attack fighter should be written.

He forwarded to NATO a sample tender for 22 Gnats plus two prototypes (to be used as trainers), quoting a price of £125,000 ($70,000) apiece or about one-third the cost of Hawker Hunters and Supermarine Swifts.

The Gnat prototypes (to be called Midges) will be powered by Armstrong Siddeley Viper jets of less than 2,000 lb. thrust. Production Gnats will fly with a Bristol Orpheus jet, initially rated at 4,000 lb. thrust. The Orpheus will be bench-tested this summer.

The production models will have a thinner wing than the prototype—6% T/C ratio as against 8% for the prototype. Sweep is less than 40 deg.

Production Gnats will be designed for Mach 1.05.

▶ **707 Design**—Details of Avro's project have not been announced officially.

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While the company says its design grew out of the three small Avro 707s, which provided research for the Avro Vulcan four-jet delta bomber, chances are the ground attack fighter will prove considerably different in appearance.

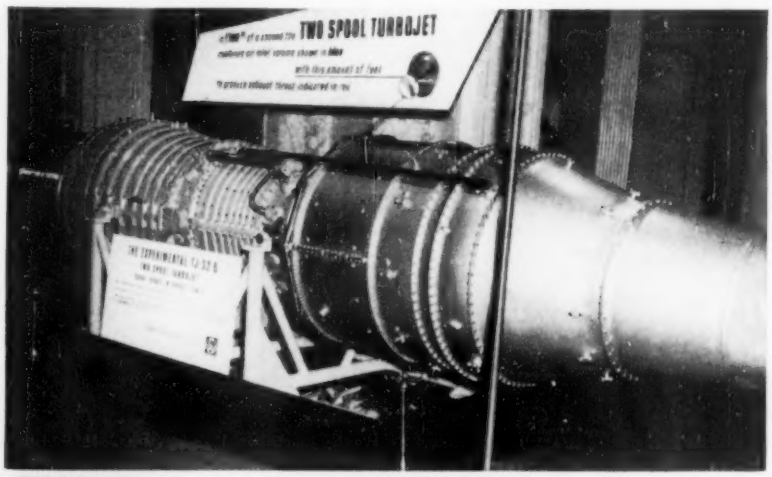
NATO's requirement for a transonic or supersonic ground attacker make it virtually certain the Avro project will have a thinner wing than the 707 series. This means buried engines would be out. Either one or two jets could be mounted in the fuselage, like the Gnat; or, more likely, two podded installations will appear, one above and one below the fuselage.

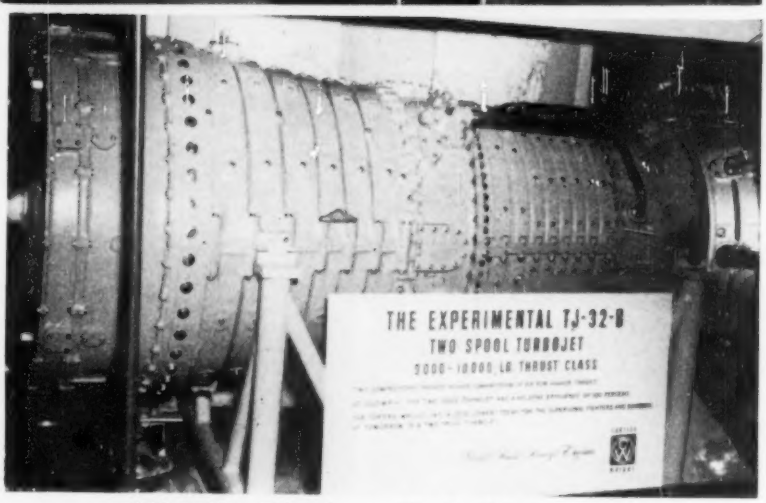
Persistent rumor that Avro is experimenting with "Conrad" tail surfaces do not apply to this project.

Avro has not specified an engine for its project, but one company spokesman denies it will be the Orpheus. In any case, the Avro project by nature will be heavier than the Gnat—probably about 9,000 lb. Sir Roy Dobson says it will be capable of carrying a mixed load of rockets, cannon and bombs.

► **Common Misery**—Both Folland and Avro claim cheap and quick production methods for their projects. Petter says he can produce the Gnat with about a fifth the man-hours needed to build Swifts and Hunters. (Folland is a subcontractor for Swift and Hunter parts.) Avro claims "a new manufacturing technique which will enable rapid production to be achieved."

Petter and Avro have one misery in





Wright Displays Twin-Spool Jet

This twin-spool turbojet engine in the 9,000-10,000-lb.-thrust class" was a feature attraction of Curtiss-Wright's five-day display of products at the Waldorf-Astoria Hotel in New York. Identified only as the TJ-32-B, the powerplant represents a stage in development of the Bristol Olympus jet to the J67 twin-spool engine, which will be in the 15,000-lb.-thrust class. Security prevented Wright from displaying an actual J67. The exhibit was attended by leading industry, business, airline and military representatives and then opened to the public. Originally planned for four days, it was extended an additional day because of heavy response from the air industry and general public.

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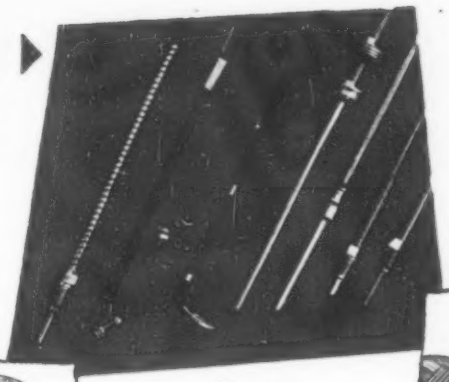

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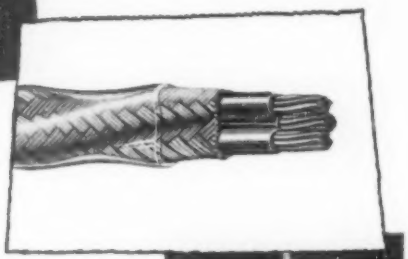

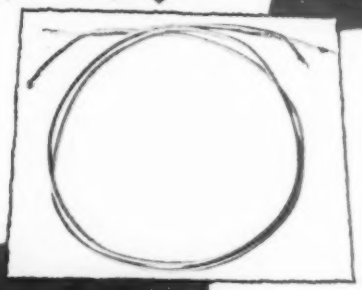

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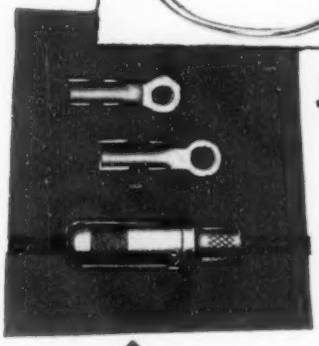

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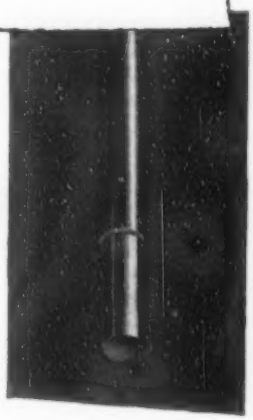

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Valve Talk

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by Marvin Miles,
Senior Member, Aviation Writers Assn.

Valve Talk is two years old this week, so perhaps you'll forgive me if I devote this column to a bit of recapitulation laced with explanation.

In the first place, I'd like to tell you a little about the operation. It's unique in that Whittaker permits me to write about practically any subject I choose in connection with the valve plant, the aircraft industry, or the military.

All departments of the company are open to a reporting job and only four columns have been shelved in twenty-four months — two for personnel changes after the writing was completed, one because I prowled into laboratory developments not yet ready for disclosure, and one (a eulogy to an aviation pioneer) for lack of clearance by relatives.

Subjects have been developed in a variety of ways, but in the early months, particularly, I depended almost entirely on suggestions while I learned the whys and wherefores of aircraft valves and the amazing technological field they represent.

Some of the initial pieces were naturals, stemming from the general divisions of the company itself — engineering, production, personnel, etc. Others popped up as the result of my wanderings through the plant, still others through office discussions, luncheon talk and spur-of-the-moment introductions.

You couldn't peek into the Whittaker test lab, for instance, without being fascinated by what I chose to call a "torture chamber." Nor could you talk with Vice-President Don McLennan, or Del Phillips, the "idea man," or Betty Anderson in final inspection, for five minutes without realizing they were excellent stories.

One column — on the solving of a complicated valve problem at Mather AFB — resulted from an idle glance at a letter that began: "This base sincerely appreciates the invaluable assistance rendered by your company . . ."

One topic grew from a discussion of the chaos wrought by inexperienced suppliers in the field . . . another from off-the-record comments on the entertainment problem in business and industry . . . another from my chance intrusion when two visiting airframe engineers talked valves with Vice-President Glenn Whitaker . . . from an unscheduled meeting with an Air Force inspector . . . from a study of design bulletins . . .

On one occasion I barged into Whittaker's semi-annual field engineering conference at a Hollywood hotel, took notes for a couple of hours, and drifted out with a good yarn on field men who hashed things over in frank give-and-take fashion.

From the beginning I have been impressed with Whittaker's open-minded attitude. How about a column on mistakes made by the company? Sure. Why not? Or — Any reason why we shouldn't compliment competitors? Of course not. Or — What about this problem or that problem? Go ahead. Write it up.

Initially, Valve Talk was to be devoted entirely to valves and the story of a young, energetic company that went all-out to keep pace with the industry. But after several months the tone changed, somewhat like the interesting vagaries of a bull session. Informality and change of pace crept into the column without plan or design.

In coffee-sipping discussions with Whittaker people, the subject would veer from a particular valve to jet transports or guided missiles or an argument over hot-rod fighters. Once we got to Navy carrier operations; another time we talked of Air Force test pilots; later of speed records.

Say — Why not do a column on it?

Thus, editorial pieces found their way into Valve Talk, general interest items without reference to Whittaker. And, believe me, they were editorial only in the sense that they represented personal ideas and observations, entirely uninfluenced by the opinions of the Whittaker Company.

Incredible?

Maybe, but true, nevertheless.

Then there have been the naturals that suggested themselves as the months went on: the review of 1952, the engineer predictions for 1953, the 50th anniversary of powered flight — even a condemnation of public apathy in air defense thinking.

For me, the production of Valve Talk has been at once challenging, interesting and instructive.

If it has held your attention for a few moments from time to time, and if it has achieved a measure of additional good will and understanding for Whittaker, then it has been a success.

common: Neither has been able to convince the Air Ministry to support their project.

Up to now, the Royal Air Force has banked on using both the Hunter and the Swift interceptors in a ground attack role.

And the Ministry of Supply, through which RAF places all its procurement and research projects, steadfastly has refused to put money into either project.

Moreover, RAF still is unconvinced that Petter can get his performance out of the Gnat without sacrificing something indispensable. Avro agrees to the extent of putting 9,000 lb. as the lower limit on light fighters. RAF top brass point to the trouble Hunter designer Sydney Camm has run into trying to keep the fighter's weight down. And the Hunter is more than twice the weight of the Gnat.

Petter's answer is based on some very simple arithmetic. Roughly speaking a pound of equipment, he contends, requires nine pounds of structure weight to lift it.

The Hawker Hunter carries about a ton of equipment, the Gnat about half a ton. Hence, Petter argues, the Gnat can give the same performance at 9,000 lb. less all-up weight.

What equipment is the Gnat sacrificing? A lot of different things made possible by "thinking light," as Petter likes to say.

The Folland designer saves on hydraulics, pressurization equipment, and flaps (the Gnat has none), merely by designing small and light.

NATO's interest, largely spurred on by Petter, visibly has shaken the Air Ministry's complacency. If the special weapons mission, as a result of its visit, decides to support one or both of these ground attack projects, the pressure on RAF to buy one or both the other may too much to resist.

Douglas Study Finds Big Copter Too Costly

Studies of helicopter transport operation by local service airlines indicate the feeder carriers will need a 40- to 60-passenger aircraft to compete on a cost basis with DC-3s, reports J. B. Edwards, chief project engineer of Douglas Aircraft Co.'s Santa Monica (Calif.) Division.

But the aircraft builder believes, after investigating the possibility of producing a helicopter (AVIATION WEEK Jan. 25, p. 15), that short-haul airlines will not be in a position to absorb a large copter for many years, Edwards says.

Suggested solution: A smaller copter and increased operating revenues through higher rates, improved and more convenient services.

AF Seeks Operational Data on Firebee

● Tests at Holloman will provide information for setting up jet drone squadrons in the field.

Ryan Aeronautical Co.'s Firebee is now undergoing "operational suitability testing" at Holloman Air Development Center, N. M.

Although actual operations are conducted at Holloman, the OST phase of the Firebee program is in the hands of the Air Force Operational Test Center of the Air Proving Ground, Eglin AFB, Fla.

This work on the pilotless jet target drone is concurrent with the research and development phase now nearing completion. It aims at developing the actual capabilities and possible applications of the Firebee, and will provide the data for setting up operational Firebee squadrons.

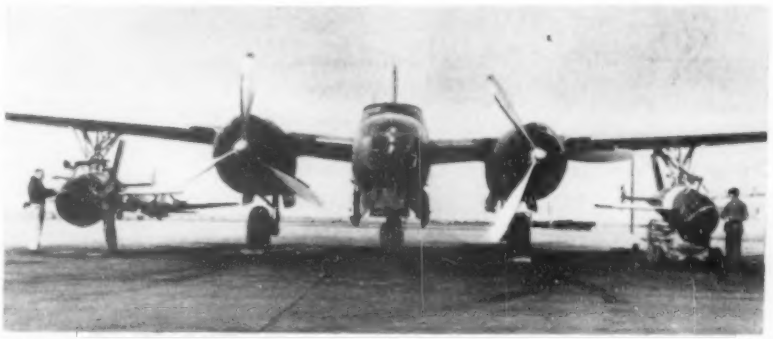
▶ **Launch From B-26**—The wing-launch method is used in Firebee OST missions. The drone rides in specially designed racks mounted at the outboard wing bomb shackles of a Douglas B-26, and is fired off by means of the electric bomb salvo switch.

In early work, only one Firebee was mounted. A water ballast tank was used under the other wing. Now the ballast tank has been removed, and two launchings can be accomplished on each mission. After the first launching, the B-26 mother ship circles out of range until parachute recovery of the drone is complete, then returns to the range for the second.

Until launching, an airman in the B-26 monitors the "bird." Once free, control is taken over on the ground, where a plotting board shows the target's path and altitude. Ground has control of the Firebee's maneuvers and the parachute recovery system by means of a "black box."

▶ **Reports From F-86**—An F-86 chase plane accompanies the drone, to report via VHF voice radio on the craft's behavior in flight. It is planned to eliminate the chase plane in the future, to get conditions more nearly like those under which jet target drone operational groups will work.

Responsibility for the OST mission rests with the 3225th Drone Squadron of Air Proving Ground's 3205th Drone Group.



B-26 MOTHER SHIP carries two Ryan Firebees, one under each wing, in Holloman tests. Pilotless target drones are released by means of electric bomb salvo switch.

BIRD ON THE WING get final adjustment in wing launch rack. Tiger face sets off OST Firebees from Ryan target drones undergoing R&D tests at Holloman center.

SAFE ON GROUND after parachute drop, Firebee waits for Air Force crane and trailer to pick it up, after which B-26 mother ship will launch second drone.

IAS Summaries

This article continues the publication of summaries of papers prepared for the Institute of the Aeronautical Sciences' 22nd annual meeting, recently held in New York.

Previous installments appeared in AVIATION WEEK Feb. 8, p. 43, Feb. 15, p. 46 and Feb. 22, p. 29.

Aerodynamics

▶ **Secondary Flows in Cascades of Twisted Blades.** F. F. Ehrich, Design Engineer, Advanced Development Sect., Aviation Gas Turbine Div., Westinghouse Electric Corp.

Squire and Winter's definitive paper on secondary flows treats the situation of a non-uniform velocity profile, though a cascade of blades whose properties (i.e., geometry) are uniform with height. The analysis focuses on the flow in a single passageway between blades. Tsien has treated the special case of uniform flow through a cascade of blades whose properties vary as a function of blade height. He uses a classical Prandtl lifting-line analysis.

Using a conceptual model similar to that of Squire and Winter, a general analysis is carried out to determine the perturbation of secondary flow resulting from a non-uniform velocity profile passing through a cascade of blades whose properties vary as a function of blade height. The general result reduces exactly to the special form of Squire and Winter and also gives a result quantitatively and qualitatively equivalent to that of Tsien.

Experimental measurements in a cascade give results indicating the pertinence of the analysis except in the regions where viscous stresses invalidate the assumptions.

▶ **Three-Dimensional Laminar Boundary Layer with Small Cross-Flow.** Artur Mager, Guggenheim Jet Propulsion Center, C.I.T.

Important problems involving three-dimensional boundary layer occur in almost all internal and external aerodynamic configurations. For many of these the flow outside the boundary layer may be resolved into a large principal component and a small crosswise velocity. In this paper, three-dimensional laminar boundary-layer flows over flat and curved surfaces are treated under such a simplification. For flat surfaces, the solutions demonstrate the effect of the free stream turning on the velocity profiles in the crosswise and primary flow directions.

When the surface curvature is large and varies so as t resemble a corner, the computed examples show the manner in which the asymmetric behavior of the boundary layer results from cross-flow. The detailed examples are chosen to illustrate flows occurring on the casing and in the blade fillets of turbomachinery.

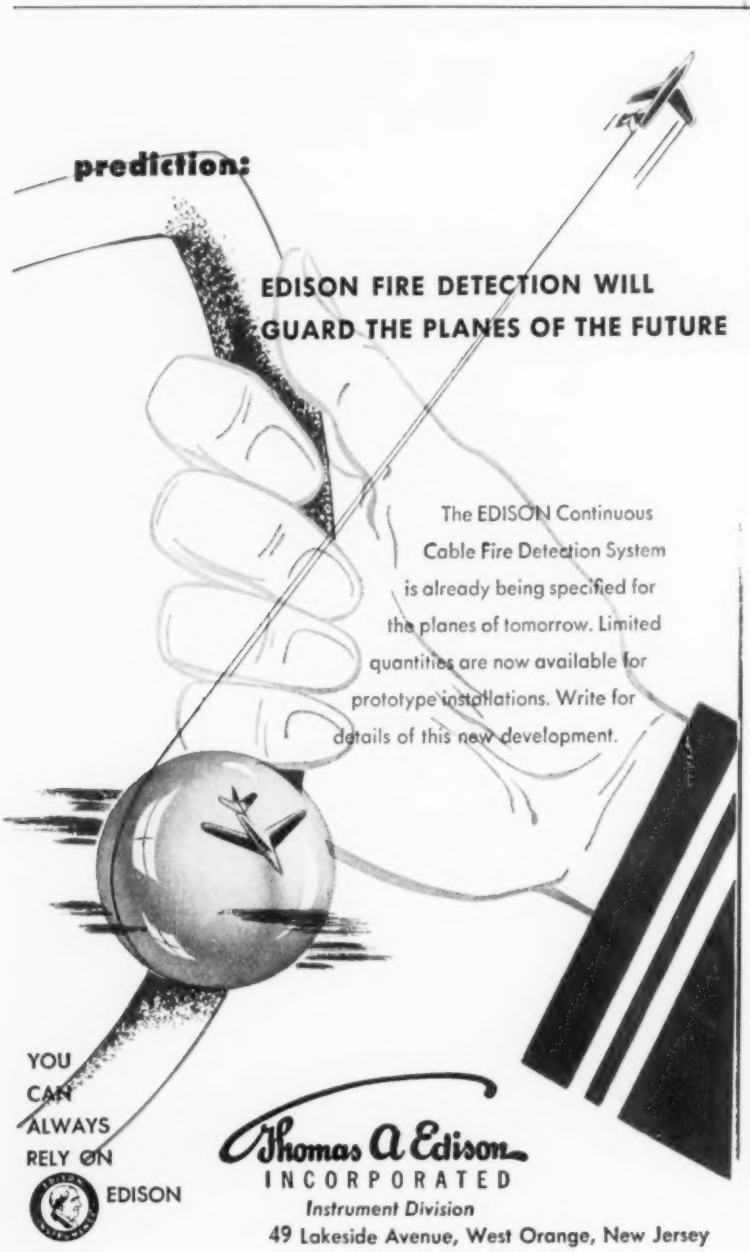
▶ **Some Considerations on the Air Forces on a Wing Oscillating Between Two Walls for Subsonic Compressible Flow.** D. S. Woolston and H. L. Runyan, Jr., Dynamic Loads Div., Langley Aero. Lab., NACA.

The problem of the determination of the air forces on an oscillating airfoil between plane walls has, until recently, been treated only for incompressible flow. The present paper is concerned with the important effects of compressibility, which may be of significance in such problems as the measurement of oscillating air forces or of wing flutter characteristics in wind tunnels and in the flutter of airfoils in cascade. The possibility of the existence of an acoustic resonance phenomenon under certain critical conditions is discussed.

The integral equation for the compressible case as obtained by Runyan and Watkins in *NACA TN No. 2552* is reviewed briefly, and a method of solving the equation is given. The procedure is applied to a number of selected cases at various Mach numbers and tunnel heights. The effect of the presence of the walls is shown to be significant near the resonant frequency and, for certain conditions, to be large even at frequencies well removed from resonance.

▶ **On the Wake and Drag of Bluff Bodies.** Anatol Roshko, Guggenheim Aero. Lab., C.I.T.

The problem of the drag and shedding frequency of a bluff body is re-examined, with particular emphasis on the region close behind the body. It is shown from experiment that the mechanism of vortex formation in this region plays an essential part in setting the base pressure on the cylinder. On the other hand, the base pressure determines the potential outer flow,



RESEARCH

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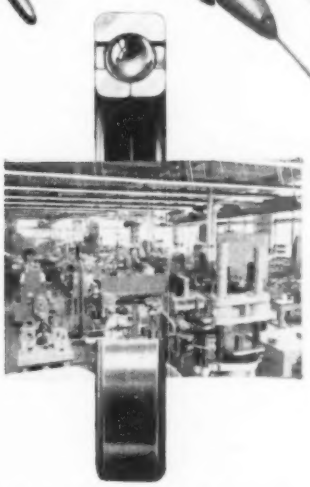

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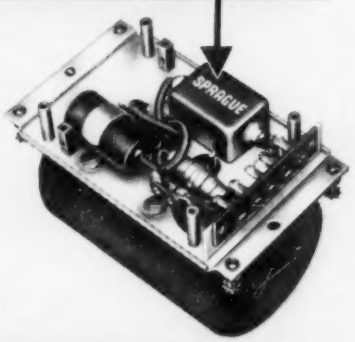

Photo Courtesy LearCal Div., Lear, Inc. Los Angeles, Cal.

PROBLEM—VHF radio transmitters and receivers (Model LTR-6), as well as Automatic Pilots (Model L-2), both manufactured by the LearCal Division of Lear, Inc., for use in business and private planes, were originally designed to use a Dynamotor Power Supply (Model LD-S). However, early in the development of this precise airborne gear, Lear engineers discovered that arcing of the commutators in the Dynamotor caused intolerable radio frequency noise.

APPROACH—Lear gave Sprague's Radio Noise Suppression Labs in Culver City the problem of designing a special filter to meet Lear's difficult specifications as to size, weight, and performance.

SOLUTION—Sprague Labs designed a tailor-made filter to meet all requirements and completely eliminate the electrical motor noise.

PRODUCTION SCHEDULES for such filters designed by Sprague's California labs are regularly met by Sprague's extensive pilot plant and mass-manufacturing facilities, the former for those sizzling rush orders, the latter for volume needs. For help with your radio noise filter applications, write, wire, or phone Sprague Electric Co., 11325 Washington Blvd., Culver City, Calif. (TExas 0-7491) or North Adams, Mass. (MOhawk 3-5311).

Sprague on request will provide you with complete application engineering service for optimum results in the use of radio noise filters.

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which is calculated here on the basis of a modified Kirchhoff free streamline theory.

With the potential theory and some ideas about the vortex formation, a semi-empirical theory for the drag is obtained. This is based on only one empirical fact, instead of the two previously needed, and it serves to determine the drag not only of the body in question but of bluff bodies of other cross-sectional shapes. In this way a correlation is obtained between bluff body shape, drag, and shedding frequency.

▶ **Recent Developments in Aircraft Control.** R. C. Seamans, Assoc. Prof. of Aero. Engrg. and Director, Flight Control Lab., Frank A. Barnes, V. W. Howard, and Theodore B. Garber, M.I.T.

Inhabited aircraft can be controlled directly by the pilot or indirectly through the use of instruments, electronics, and servo equipment. Uninhabited aircraft can be controlled by means of programmers, radio links, or homing systems. In all cases, human beings must select and supervise the mission of the aircraft and must make command decisions when new information becomes available. It is felt that human beings can exercise judgment more effectively when they are relieved of routine operations, especially actions involving muscular fatigue and manual dexterity.

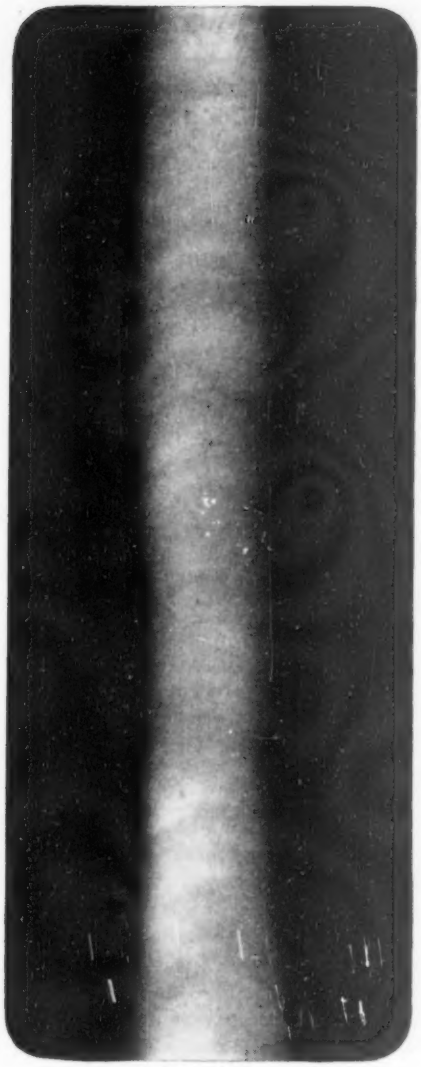
However, the present trend toward supersonic speeds is introducing more violent changes in the aerodynamic loading of the aircraft, especially in maneuvering flight. As a result, large hinge moment variations are expected, and, in addition, the center of pressure shifts position with Mach number, causing significant changes in static stability. Consequently, equipment to position the control surfaces and to stabilize the aircraft in the maneuver desired by the human operator appears desirable in both inhabited and uninhabited aircraft.

In this paper, the mechanization of several control systems is discussed, and a generalized design is analyzed in nondimensional form. In the analysis, consideration is given to changes in static stability, to the effect of fuselage bending, and to the location of gyro elements in the aircraft. In addition, the ability of the control system to minimize the effect of gust interference is discussed.

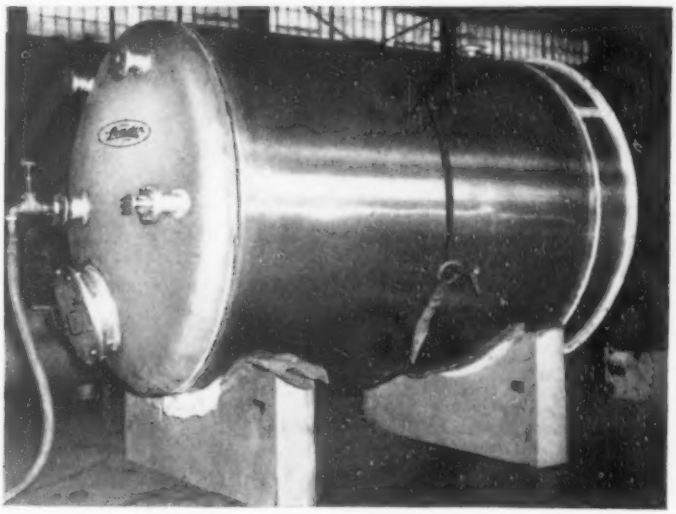
▶ **Long-Range Radio Aids to Navigation.** J. A. Pierece, Director, Div. of Applied Science, Harvard University.

This paper discusses primarily the propagational background of low-frequency transmission and points out the advantages and limitations inherent at long wave lengths. The chief advantage is reliability and the greatest disadvantage is a fundamental requirement for high-power and large transmitting antennas. To the extent that the latter are provided, it is shown that the operational capabilities of various systems are not greatly different.

The high ambient noise at low radio frequencies makes long-distance operation impossible except with relatively narrow receiver bandwidths. Navigational aids are extremely fortunate because the required rate of flow of information and the required bandwidths are much smaller than for communication circuits. Thus navigation may make good use of frequencies lower than



RADIOGRAPHY makes positive



about negative pressure

Specifications for this tank—designed to operate from vacuum to 25 pounds' pressure—called for welded 2S aluminum. This, as welders know, could cause problems. But the builders called on radiography. Here is what they say:

"X-rays played a very important part in the extensive research to determine the most suitable method of welding the vessel. Without the use of x-ray we might never have obtained the high quality and uniform results."

Which shows two important facts. First, that radiography proves the soundness of welds. Second, that it expands the use of the welding process.

This is good reason that today more and more welders make use of radiography. If you would like to know how it can help your business, get in touch with your x-ray dealer and talk it over.

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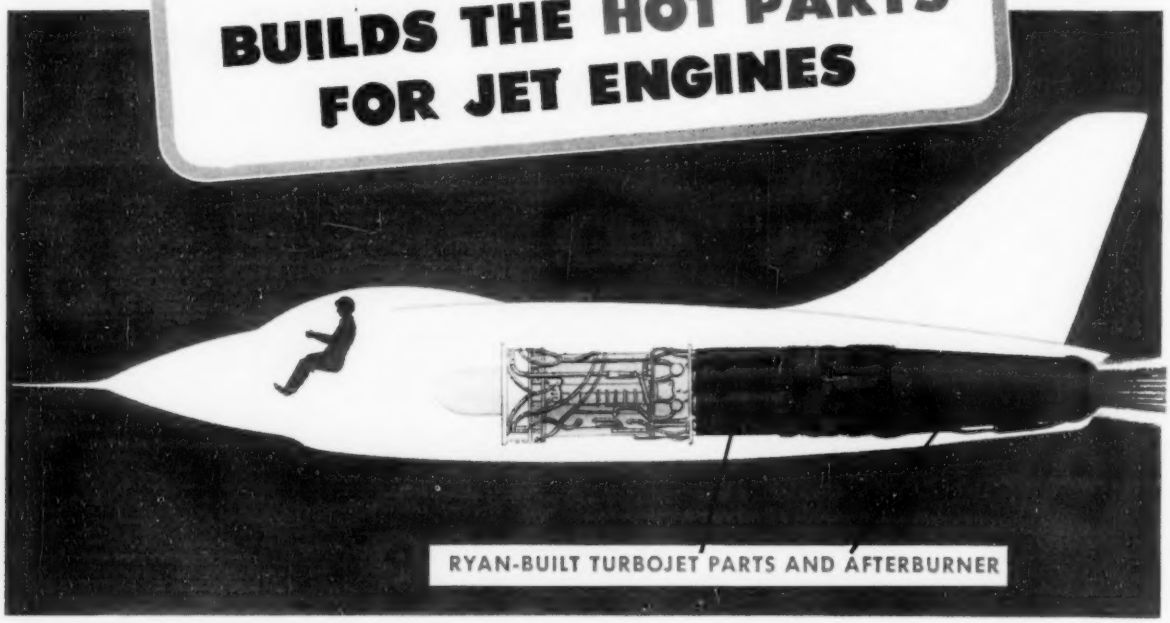
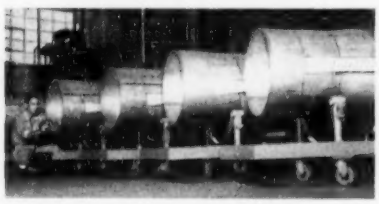


RYAN-BUILT TURBOJET PARTS AND AFTERBURNER

The startling performance of America's great new fighters and bombers depends largely upon the knowledge and skill of the manufacturer of their jet engine components. These rugged "hot parts" must be built to jewel-like precision and exhibit amazing strength under extremely high temperatures.



Ryan Afterburners for Westinghouse J-46

Ryan is a pioneer in this field, developing the first American jet engine afterburner in connection with the Navy's first jet plane, also built by Ryan. Today, Ryan leads in the fabrication of sheet metal turbojet components and afterburners because of a unique combination of advantages: long experience in high temperature metallurgy – extensive know-how in forming, welding and machining heat-resistant alloys – the industry's most modern array of high precision machines. Few plants anywhere have the necessary equipment, methods and know-how for this specialized work.

With these facilities, Ryan is building afterburners and jet engine parts for General Electric Westinghouse, Pratt and Whitney Aircraft, Wright Aeronautical and others. Ryan's $4 million worth of modern production tools produce high temperature jet engine components used in North American F-86 and F-100 Sabres, Boeing B-47 and B-52 Jet bombers, Convair F-102 fighters, Douglas F4D Skyray fighters and A3D attack bombers and McDonnell F-101 fighters. Currently, Ryan is building six different types of afterburners.

As the only maker of jet engine parts which also designs, builds and flies jet aircraft, Ryan is uniquely qualified for this exacting work. In virtually *every* field of aircraft development and production, Ryan is better prepared to solve the complex engineering and fabrication problems posed by the high speed air age.

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those useful for telegraphy. Optimum design of radio aids still awaits, however, a better delineation of low-frequency radio noise. Examples of the advantages to accrue from such studies are given.

Meteorology

(Joint Session in Cooperation with the American Meteorological Society)

▶ **The Air Motion in the Upper Atmosphere.** B. Haurwitz, New York University.

The various factors are discussed which determine the motion of the atmosphere at high levels—that is, above 20- to 30-km. elevation. A summary is presented of the present state of our knowledge concerning the high-level air circulations, based on direct observations, in direct inferences and theoretical reasoning.

▶ **Photographic Meteor Trains.** F. L. Whipple, Harvard College Observatory.

Multiple photographs of persistent meteor trains have been made with Schmidt and Baker-Super-Schmidt telescopes of wide field and fast focal ratio, F/0.65. The corresponding mean wind speed normal to five trains is 38 m. per sec., and the mean velocity 29 m. per sec., in the altitude range from 81 to 113 km. Corresponding total velocities are estimated at 68 and 51 m. per sec., respectively. The winds change rapidly with altitude, showing excursions to more than 100 m. per sec. and average maximum shears of 50 m. per sec. per km. Deviations from the average winds for each train show a zero correlation with winds separated about 5 km. in height (scale height =6.8 km.), but two show negative correlations for greater height differences to 10 km. or more. A nearly horizontal train shows much smaller wind fluctuations with distance than highly inclined ones.

These results suggest tentatively that roughly half the kinetic energy of the high-altitude winds is contained in large-scale systematic motions and the other half in shallow (3-10 km.) eddies, perhaps of the order of 50-km. in horizontal diameter.

The numerical values of the measured winds are in agreement with those obtained by radar-meteor techniques and indicate the validity of these techniques.

The reserved wind shears are surprisingly high and demand explanation in terms of energy injection mechanisms.

▶ **Sporadic E Movement.** N. C. Gerson, Air Force Cambridge Research Center.

Sporadic E, which is located near 110 km., has been studied during the period 1949-1951, inclusive, in cooperation with the Radio Amateurs of North America. These amateurs, operating at a radio frequency of 50 mc. per sec., supplied the basic reports from which the presence, growth, movement, and dissipation of sporadic E clouds were determined. Usually the trajectory of the moving sporadic area could be delineated. During their movement, many of these clouds grew markedly in size and on some occasions extended over an area of 1,000,000 km.²

The drift of the E's areas in the great majority of cases had an easterly component; however, in some instances westerly

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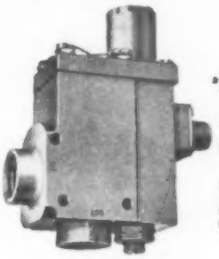
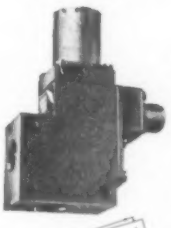
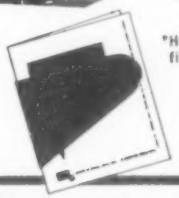
¼" and ⅜" LINE SIZES.
Operating pressure: 350 psi;
Relieves inlet to outlet within 500 to 700 psi range.
Weight: 0.60 lb.
(Also available in 1500 and 3000 psi capacities.)



*25853 PILOT OPERATED.
NORMALLY CLOSED.
⅜" and ½" LINE SIZES.
Operating pressure: 3000 psi.
Weight: 1.45 lb.
(Also available with manual override or normally open.)



*26610 PILOT OPERATED.
NORMALLY OPEN.
¼" and ⅜" LINE SIZES.
Operating pressure: 3000 psi.
Weight: 0.81 lb.
(Also available normally closed.)



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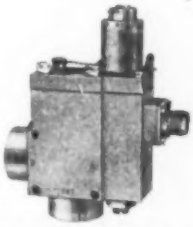
CURRENT DRAIN: 0.5 Amp at 24 VDC.
TEMPERATURE RANGE: −65°F to +250°F.
LIGHTWEIGHT, COMPACT, CORROSION RESISTANT CONSTRUCTION.



*25670 PILOT OPERATED. WITH MANUAL OVERRIDE.
NORMALLY CLOSED.
¾" and ⅞" LINE SIZES.
Operating pressure: 3000 psi.
Weight: 1.58 lb.
(Also available normally open without manual override.)

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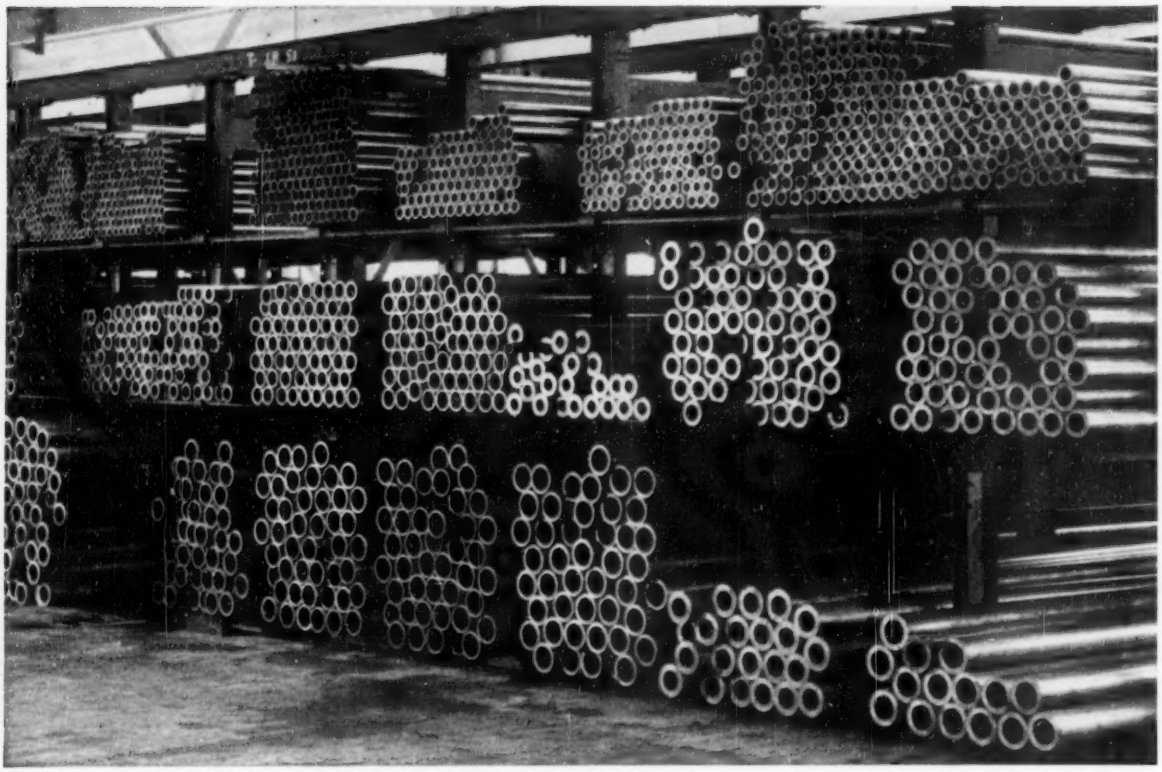

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WE carry 101 different sizes of Timken® 52100 steel tubing in warehouse stock—from 1″ O.D. to 10½″. If you order today, we'll ship tomorrow!

52100 is a high-carbon chromium steel that will do most of your hollow parts jobs. In moderate sections it will through-harden and it has been used in place of more expensive steels. You can heat treat it to file hardness and then temper back to any desired point.

Timken 52100 steel is ideal for hollow-parts jobs like these: aircraft parts, ball bearing races, pump parts and plungers, collets, bushings, spindles, grinding machine parts and precision instrument parts.

The Timken Company is America's pioneer producer of 52100 tubing. We have a background of experience in making it that can't be equalled. We've developed rigid quality control procedures that check every step of the operation. Result: uniform high quality from tube to tube, heat to heat.

Write, wire or phone us now for immediate delivery of your less-than-mill-quantity orders of 52100. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

TIMKEN

TRADE-MARK REG. U.S. PAT. OFF.

Fine Alloy STEEL

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING

motions were noted. The average speeds were about 200± km. per hr. It is interesting to note that the average speed is almost the same as that deduced from other sources, including the motions of ionospheric irregularities.

Electronics

▶ **Military Personnel Training Requirements.** Brig. Gen. G. F. Schlatter, USAF, Deputy Chief of Staff for Operations, Hq., Air Training Command, Scott AFB.

The Armed Forces must maintain a strong defense capability within the ever-present limitations of economy. Military capabilities have been increased tremendously by recent progress in science and the equipment that science has developed. One of the most fruitful fields of development has been in electronics. We find electronic devices an integral part of practically all our new equipment.

Fear has been expressed that human limitations will limit technological development, and this can indeed occur if we neglect to expend effort to simplify operator and maintenance techniques. New and increasingly complex equipment has created a major problem in training of personnel. Losses of trained personnel each year further aggravate the problem—approximately 25% of the required technical personnel must be trained each year. Advances in screening and in training methods have, in part, eased the problem, but much more can and must be done to simplify operator and maintenance techniques. The greatest gains in this direction can be accomplished on the drawing board and in the laboratory by the engineer.

▶ **Personnel Training Required to Produce Large Quantities of High-Performance Aircraft.** Leverett P. Wenk, Director of Training, Republic Aviation Corp.

In less than a decade, the aviation industry has been called upon twice to train innumerable thousands of engineering, management, and production personnel needed to supply aerial armament to not only our own military forces but those of friendly nations. The buildup at the outbreak of the police action in Korea came during a period of relatively full national employment without the impetus of an all-out war and took ingenuity and perseverance to channel workers with sufficient skills back into a defense industry from which many had recently been laid off.

In such a tight labor market, training had to be appealing, so that methods that had been used during World War II had to be changed or modified.

This paper on personnel training outlines not only the problems presented but some novel means employed to cope with the problem from the recruiting stage to the training of management, engineering, and production personnel. It also poses the problem of training future engineering and technical personnel who will be needed to produce the even more complicated aircraft and guided missiles of the future.

In addition to strictly technical training, it also deals with the human relations aspect of a supervisor's job and how this training has been conducted.

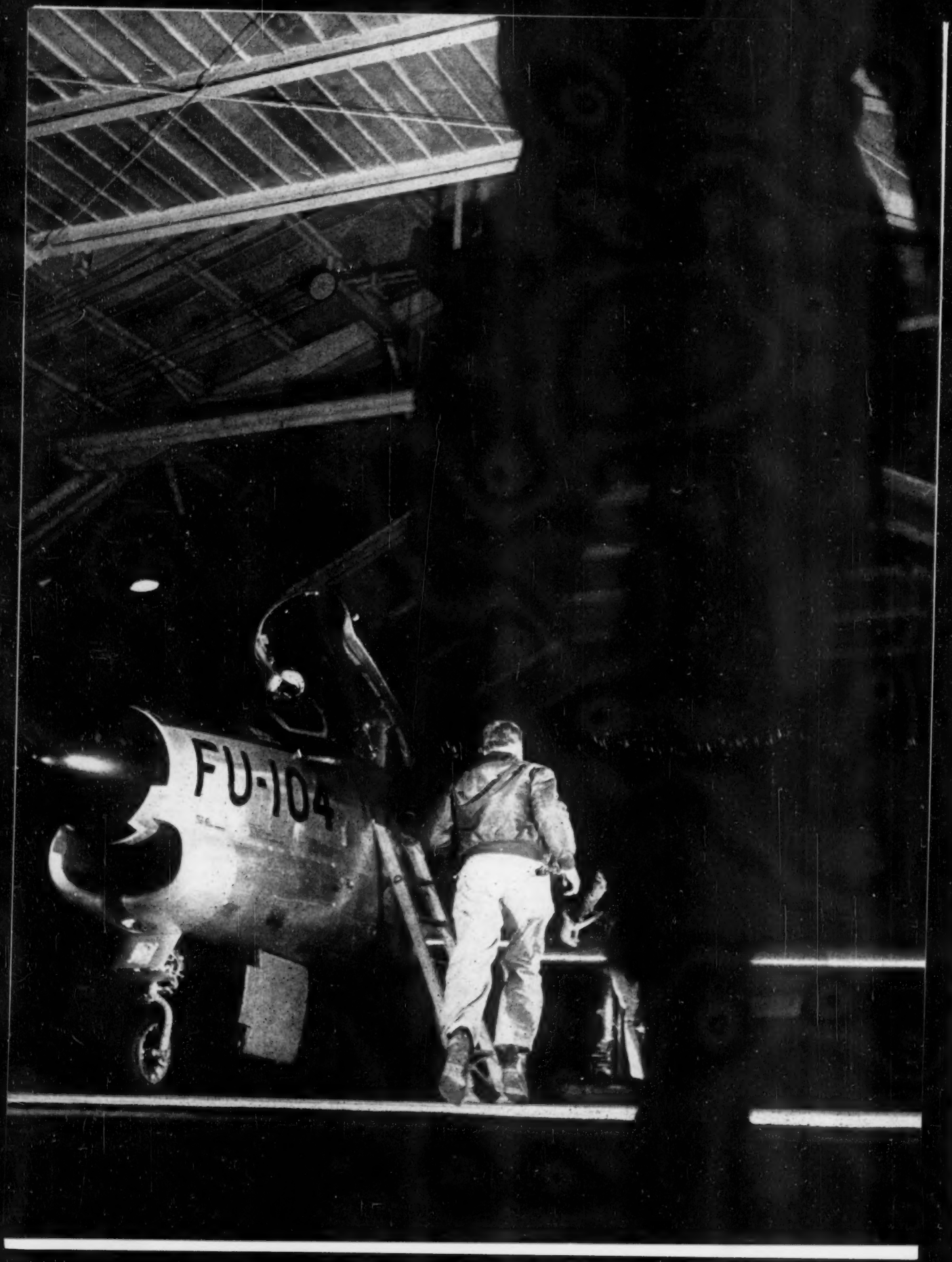
You may well be one of a select group of men intently interested in developing tomorrow's jet fighters . . . special reconnaisance aircraft . . . jet bombers and transports. The Aircraft Division of Fairchild offers a genuine creative opportunity to such men.

New concepts of flight for the jet era . . . as well as engineering advances on the world-renowned C-119 Flying Boxcar and soon-to-be-produced C-123 Assault Transport are coming from Fairchild. Diversified, stimulating assignments like these increase the inventive challenge to Fairchild's team of qualified aerodynamicists.

Gracious country living only minutes away from urban Baltimore or Washington . . . paid pension plan . . . an excellent salary with paid vacations . . . ideal working conditions . . . generous health, hospitalization and life insurance . . . and the many other benefits of a progressive company add to the pleasure of working with Fairchild.

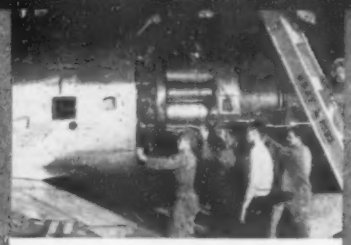
You'll be investing wisely in a secure future if you take time today to write to Walter Tydon, Chief Engineer, outlining your qualifications. Your correspondence will be kept in strict confidence, of course.

ENGINE AND AIRPLANE CORPORATION
FAIRCHILD
Aircraft Division
HAGERSTOWN, MARYLAND


FU-104

HOW G-E JET SERVICE ENGINEERING WORKS FOR YOUR G-E POWERED AIRCRAFT

ON THE CANNING LINE. Technicians watch for engine mishandling, check packing procedures.



INSTALLATION. G-E tech reps are on hand 'round-the-clock to help personnel with installation and maintenance problems

CLASSROOM SESSIONS given by G-E jet engineers help pilots and mechanics have a better understanding of G-E turbojets.

FLIGHT OPERATION. G-E tech reps are available throughout the world—whenever, wherever needed.

G-E jet service helps keep F-86D's
READY FOR CONTINENTAL DEFENSE

G-E service engineering at U.S. Air Force Bases helps maintain high percentage of aircraft readiness by speeding engine maintenance

General Electric jet service engineering has one all-important objective— to help G-E turbojet users get the highest possible utilization from their engines at all times.

For example, take the 71st Fighter-Interceptor Squadron at Coraopolis AFB, an Air Defense Command Base near Pittsburgh. There G-E tech reps work with USAF maintenance personnel to maintain high availability of North American F-86D's.

Besides improving engine maintenance and overhaul procedures, the tech reps lower turbojet repair time-cycles by applying new and improved service techniques developed from G-E operating experience.

General Electric jet service engineering in the Pittsburgh area is, of course, part of G.E.'s worldwide jet service program. G-E tech reps are stationed in Japan, Greenland, Germany, England, Puerto Rico, Alaska, Italy, Africa, and Korea. In the United States, jet representatives are available to airframe manufacturers, the Air Force, and the Navy from coast-to-coast.

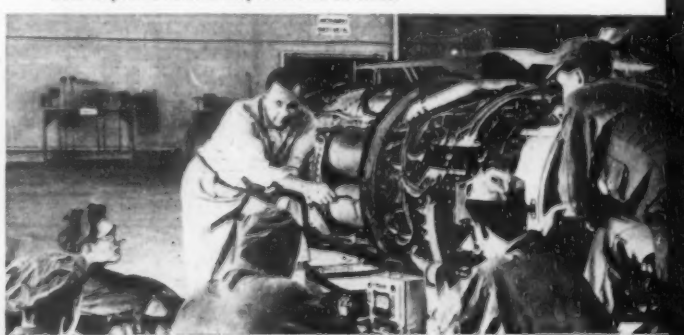
For further information on this program, contact a G-E Aircraft Specialist. He'll be glad to tell you how G-E service engineering can go to work for your aircraft—today, or five years from now. *Section 230-26, General Electric Company, Schenectady 5, N. Y.*

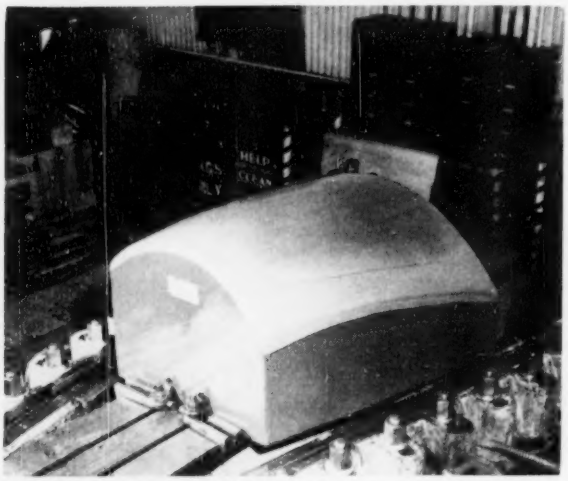
You can put your confidence in—

GENERAL ELECTRIC

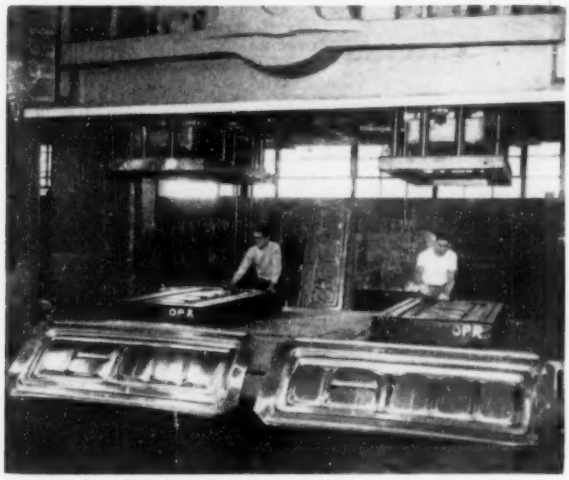
READY TO TEST a new G-E J47-17 engine, personnel of 71st Fighter-Interceptor Squadron listen as G-E tech rep outlines necessary steps.

INFORMAL CLASSES are conducted by G-E reps to orient USAF personnel on repair and servicing techniques. Below, G-E engineer explains thermocouple device to class.





STRETCH PRESS DIE is made by casting 2-in. phenolic resin face over core. A common core material is concrete.



DOUBLE-ACTION DIE for 8,000-ton Bridsboro press can be made of phenolic for one-quarter the cost of metallic die.

Plastics Find Wider Use in Tooling Dies

Production of drawing and forming dies made of plastics has made big strides in the aviation industry. Progress in this field is an extension of earlier, widespread work in creating jigs and fixtures from plastics.

In addition to conserving strategic materials, plastic tooling has cut labor costs and saved valuable production time.

How plastic materials have been put to work in aircraft production tooling has been outlined for AVIATION WEEK by Lockheed Aircraft Corp.'s manufacturing-research department's G. J. (Jake) Walkey.

▶ **Four Types**—Plastics for tooling fall into four major categories, each of which does a specific job. The four basic types:

- **Epoxy.**
- **Phenolic.**
- **Ethyl cellulose (thermoplastic).**
- **Polyester.**

▶ **Work With Epoxies**—Epoxy resins, latest addition to the tooling field, have many desirable characteristics.

They are dimensionally stable and can be cured at room temperature, thus eliminating the need for ovens or other heat sources. They can be made flexible to almost any degree by the addition of polymers. Epoxies have good adhesive qualities and impact resistance, are not corrosive.

Epoxy resins are not generally cast in the thicknesses over ½ in., because of heat generated when a mass of the material sets. They have a tendency to soften at temperatures above 250F, Walkey says, and have short pot-life, hence should be mixed in small batches or in quantities which can be used in about 30 min. Pot-life can be extended to about two hours, however, Walkey claims.

Epoxy resins are suitable for the manufacture of fibrous glass laminate fixtures such as drill-router shaper and contour types, and faces for double-action dies, Keller blocks, and drop-hammer punches.

▶ **Epoxy-Faced Punch**—An outstanding development in plastic tools has been created for drop-hammer operations in Lockheed's plastic die shop. The development affords the advantage of a double-action die and the simplicity of drop-hammer work.

The tool consists of a standard Kirksite die with an epoxy-faced punch, Walkey says. The draw ring is made of a thermoplastic material and floats on the punch by means of elongated holes in the ring and two pins through the punch. Draw ring pressure is applied by placing sheet rubber between the ring and the head of the press. Stage operation is accomplished by removing rubber as the draw progresses.

Units formed have the appearance of double-action die parts, free from wrinkles and folds, saving speed hammer operations and extra anneals of material otherwise necessary because of work-hardening. The tool has formed such materials as 75S aluminum alloy, quarter-hard stainless steel, and titanium, Walkey reveals.

▶ **Jobs for Phenolics**—Phenolic material was the first resin used successfully at Lockheed in production tooling for aircraft. Phenolic stretch press dies now are considered standard tooling in Lockheed plants, Walkey say.

A typical stretch press die uses a phenolic resin face about 2 in. thick, cast over a wooden core. Many of these tools have been cast over a concrete core reinforced with steel. Others have been cast over a phenolic foam core. The concrete-core dies have been cheapest to construct, but are heavy and difficult to handle.

Numerous double-action phenolic dies are used to form parts which would be too costly if formed in metal dies because of tooling expense and short schedules involved. This type of phenolic die can be constructed for about 25% of the cost of a metal die. It can be fabricated in about 10% of the time because the die and punch are cast almost to finished dimensions so that very little grinding is required to finish the tool. Automobile manufacturers are using this type of tooling for short runs and pilot lines.

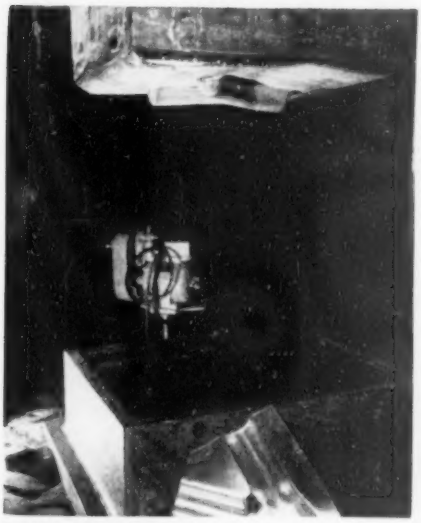
Phenolic tooling resin also is used for master models. Phenolic masters have a hard, dimensionally stable surface —especially applicable for duplicating jobs on such equipment as Keller or Hydrotel machines.

Other applications for phenolics include milling, assembly and formed router fixtures.

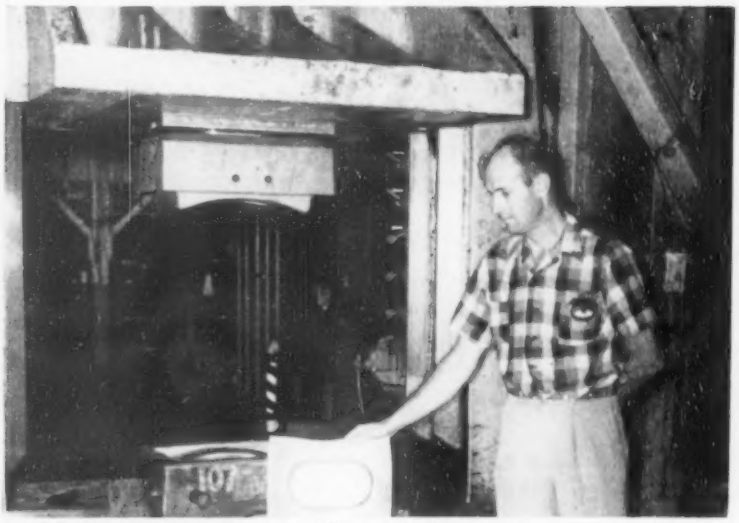
▶ **Dummy in Phenolic**—Dummy parts often are made of phenolic resins.

Walkey cites a cast dummy duplicate

New Developments in Lockheed's Plastic Die Shop

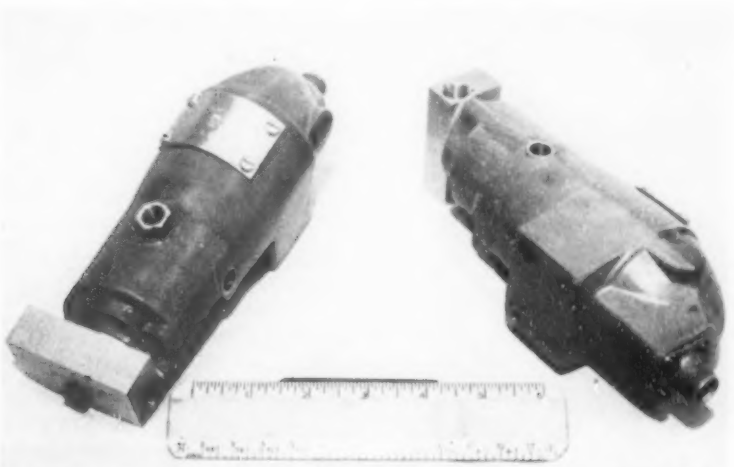


FEMALE DIE is formed by casting thermoplastic against phenolic male punch.



DROP-HAMMER DIE consists of standard Kirksite die and epoxy-faced punch. The draw ring is made of thermoplastic material that floats on punch.

PHENOLIC MASTER has hard, stable surface, ideal for duplicating work.

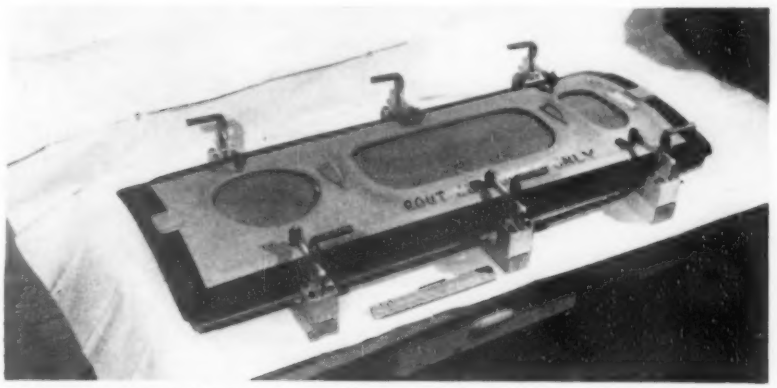


DUMMY DE-ICER PUMP cast in phenolic plastic (right) is used during connection operations to avoid chance of damaging real pump (left).

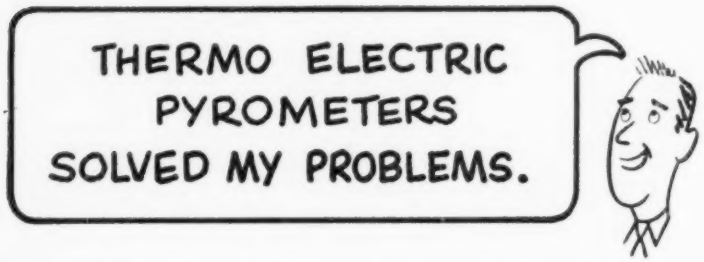
of a de-icer pump. The dummy is used for making plumbing and electrical connections. The real pump is installed as a final operation, thus avoiding handling and additional inspection and checking of the unit. Cost of the plastic casting is about $8, while the pump value is about $125.

Phenolic tooling resin available now is dimensionally stable, will reproduce extreme detail. It is easily mixed and cast, can be worked with standard woodworking equipment, is easily repaired. Many of the phenolic tools have been in use for a considerable period and are still producing as well as when they were new.

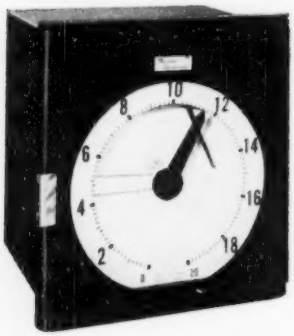
► **Thermoplastics Data**—Thermoplastic materials of ethyl cellulose base have



ROUTER FIXTURE uses phenolic backup for formed part and polyester-fibrous glass laminate laid up over part. Tool's working edge can be repaired with epoxy-type resin.



Thermo Electric makes many products that help solve problems in the field of temperature measurement and control. T-E controllers and indicating-recorders are good examples. They are both made in two types: potentiometer pyrometer and resistance thermometer. They are accurate (±¼ of 1% of the range), rugged, simple in design, easy to maintain. Ranges from −100° — + 600° F up to 0 — 3000° F.



THERMO ELECTRONIC INDICATING-RECORDER

Only three moving parts in the recording system—pen arm is driven from a cam, which permits linear charts to be used for all temperature measurements —full scale pen travel only 4 seconds. Easily adapted to measure humidity, solution conductivity, speed, pH, direct current, DC voltage, or other variables.

THERMO ELECTRONIC CONTROLLER

Two-position control action is continuous and instantaneous — potentiometer pyrometer type is sensitive to changes of as little as ±1.5° F, or less; resistance thermometer type is sensitive to changes of as little as ±0.1° F.

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controller, resistance thermometer type, bulletin 55-C
indicating-recorder, both types, bulletin 60-C

Pyrometers • Thermocouples • Protection Tubes • Quick-Coupling Connectors
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IN CANADA—THERMO ELECTRIC (Canada) Ltd., BRAMPTON, ONTARIO

special significance in the manufacture of drop-hammer tooling. Use of thermoplastic punches is quite practical for normal forming operations but should not be used where sharp, deep draws are necessary, or with material requiring the application of heat for forming, Walkey says.

Because thermoplastics are resilient, allowance does not have to be made for material thickness. The material is reclaimable, may be reused many times. Although cost is greater by the pound than zinc-based metals, Walkey says, it is as cheap per cubic foot. Weight of a cubic foot is 77 lb.

Thermoplastics for tooling have been greatly improved in the past year and now are very strong and dimensionally stable. They require either a kettle-type heater or a heated extrusion machine such as used at Lockheed to melt the plastic.

A thermoplastic die or punch can be refaced in a matter of minutes and will be equal to new, Walkey states. This is done by raising the temperature of the thermoplastic face with a Calrod heater, then reseating the other half of the tool and allowing the plastic to cool. It requires no grinding-in or barbering, thus eliminating many hours of hand finishing.

Thermoplastics can be used in double action die setups—the preferred arrangement being a thermoplastic die and a phenolic punch. The draw ring may be a phenolic or epoxy material or metal.

► **Polyester Details**—Polyester resins have been used in conjunction with fibrous glass cloth for many years in the construction of router, welding and trim fixtures and in drill jigs. Polyester-glass-cloth-reinforced drill cages have saved thousands of hours of metal-forming and welding time.

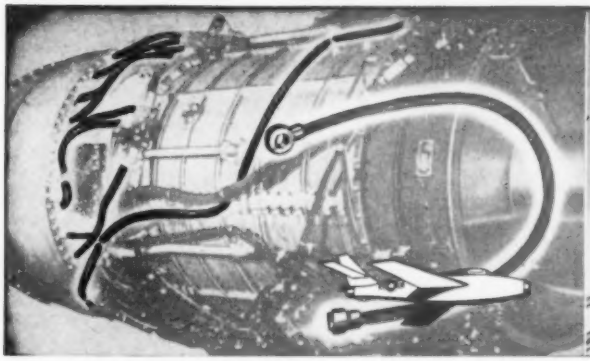
These fixtures are much lighter to handle than steel units, making them practical for female workers and reducing fatigue for all workers who handle the fixtures. They are easily repaired or reworked where engineering changes are required. Steel drill bushings are installed easily.

While polyesters are not as dimensionally stable as epoxy resin layups, this condition has been remedied by using steel or aluminum tubing as a reinforcement.

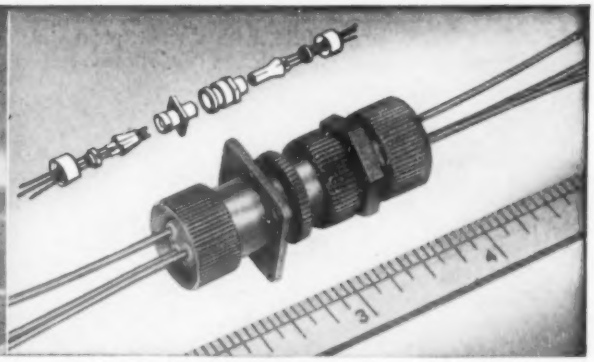
Polyesters are coniderably cheaper than epoxies and will continue to be used for tooling where price is important, Walker says. They are better where heat is involved, he points out. Most polyesters will remain stable and strong up to 250F. They have longer pot-life than the epoxy type resins, hence are more adaptable to large layups. They can be catalyzed for either sunlight- or oven-cure.

—Irving Stone

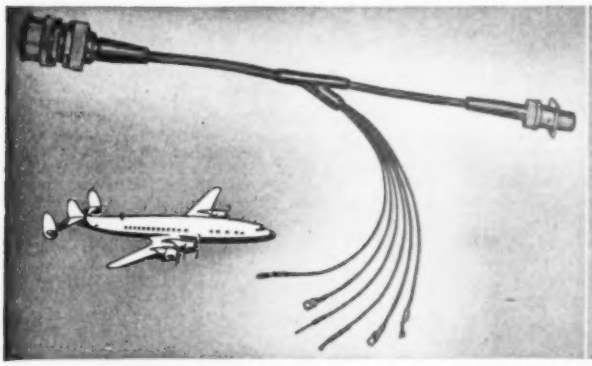
Four design ideas you can use right now...



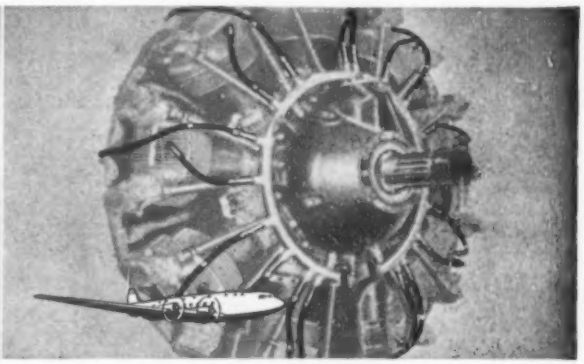
DEPENDABLE FUEL FEEDING. Fuel for the J65 Turbojet Engine is injected to the burners through Titeflex® flexible metal hose. Tough, lightweight Titeflex—tested for temperatures from —70°F. to +600°F. and for pressures up to 500 psi—reliably conveys fuel to engine nozzles; withstands vibration and rough use; is excellent for complex configurations.



FAILURE-FREE INSTRUMENTATION. Designed primarily for instrumentation service at high altitudes, lightweight Titeflex 07 Connectors are pressure-tight and resistant to moisture and corrosion. Plug and receptacle, mated, weigh only ⅔ of an ounce! Special sizes, meeting AN Specifications, can be made with 2 or 3 pins and AE threads—and adapted to your design.



CUSTOM WIRING SYSTEMS. Titeflex specializes in designing and building special "packaged" wiring systems and component assemblies for today's complex aviation and guided missile installations. These may be jacketed with protective silicone or other compounds—and Titeflex Special Connectors used as integral parts solve complex wiring problems.



RADIO SHIELDING. Titeflex Harness for reciprocating engines is our specialty. Titeflex makes a wide range of standard ignition harnesses meeting rigid aviation specifications—can also supply component parts, such as serviceable leads for military and commercial aircraft. Titeflex application on Wright R 1820 Engine includes harness and leads.

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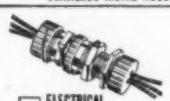

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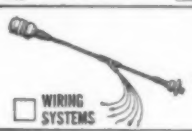
☐ RIGID AND FLEXIBLE WAVE GUIDES



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PRODUCTION BRIEFING

▶ **Lockheed Aircraft Service-International, N. Y.** International Airport (Idlewild), has finished steelwork on its $3-million hangar at the field, with completion slated for early this year.

▶ **Northrop Aircraft, Inc.,** Hawthorne, Calif., has opened a liaison office at Hill AFB, Ogden, Utah, which is the designated maintenance and supply center for Northrop F-89 Scorpion all-weather interceptor. L. H. Coates manages the new office.

▶ **Shallcross Manufacturing Co.,** Collingdale, Pa., has added larger offices and increased production and engineering facilities to handle firm's line of precision wirewound resistors, rotary selector switches, audio attenuators, and electric-electronic test equipment and assemblies.

▶ **American Instrument Co.,** Silver Spring, Md., has built a 40,000-sq. ft. plant at Savage, Md., to facilitate government production and maintain security in electronics and optical production and moisture engineering.

▶ **Cadillac Gage Co.,** Detroit, Mich., has completed a new plant with double the former facility's area and twice its machining capacity. Firm makes precision plug and ring gages, Pla-Chek gages and hydraulic servo controls.

▶ **McGill Manufacturing Co.,** Valparaiso, Ind., has completed a 45,000-sq. ft. plant with an added 33,000 sq. ft. of office space to consolidate and increase output of bearings. Structures cost more than $1 million.

▶ **Ryan Aeronautical Co.,** San Diego, Calif., has received a $1.3-million contract from General Electric for J47 jet engine components for a new item on the engine not previously made by Ryan and production is scheduled into early 1955. Ryan has also received a contract for afterburners on the newest model Wright turbojet.

▶ **Consolidated Engineering Corp.** has opened new and larger quarters for its Western Regional Office at 1025 E. Green St., Pasadena, Calif.

Navy Contracts

Contracts recently announced by the Navy's Aviation Supply Office, 700 Robbins Ave., Philadelphia 11, are:

Eicor, Inc., 1501 W. Congress St., Chicago 7, Ill., inverters, 1,612 ea., $155,701.

E. H. Fischer, Inc., 826-30 S. 18th St., St Louis 3, Mo., paint, interior, flat, wall, white, 69,000 gal., $80,985.

Clifford Mfg. Co., div. of Standard-Thomson Corp., 152 Grove St., Waltham, Mass., items and spare parts for oil coolers, 277 ea., $96,788.

Cleveland Pneumatic Tool Co., 3781 E. 77th St., Cleveland 5, Ohio, spare parts used on struts for various aircraft, $121,762; maintenance parts used on strut assys., $56,594.

Foote Bros. Gear & Machine Corp., 4545 S. Western Blvd., Chicago 9, Ill., actuator, 203 ea., $263,186.

Air Associates, Inc., Teterboro, N. J., actuators, 18 ea., $42,368.

Aleo Valve Co., 865 Kingsland Ave., St. Louis 5, Mo., various assys. and windshield wiper components for AF-2S, -2W aircraft, $47,916.

Arma Corp., Roosevelt Field, Garden City, N. Y., maintenance parts used on adapters, $43,594.

Armstrong Furnace Co., 851 W. Third Ave., Columbus 8, Ohio, containers for various engines, $65,090.

Berger Brothers Co., New Haven 7, Conn., suit, anti-blackout, 1,935 ea., $72,253.

Chicago Aerial Survey Co., Chicago, Ill., services and material to overhaul photographic equipment, $25,000.

Cleveland Pneumatic Tool Co., 3781 E. 77th St., Cleveland, Ohio, maintenance parts used on various strut assys., $29,838.

Continental Aviation and Engineering Corp., 1500 Algonquin Ave., Detroit 15, Mich., maintenance parts for conversion of various aircraft engines, $125,223.

Droitcour Co., 720 West Shore Rd., Warwick, R. I., valve, hydraulic, 478 ea., $29,110.

Eclipse-Pioneer Div., Bendix Aviation Corp., Teterboro, N. J., armature assy. used with Eclipse starter assy., 991 ea., $100,-791.

L. W. Foster Sportswear Co., Inc., Hancock & Westmoreland Sts., Philadelphia 40, Pa., aviator's jacket, 4,600 ea., $78,200.

Frey-Yenkin Paint Co., 251 N. Sandusky St., Columbus 16, Ohio, paint: titanium, lead, zinc and oil, 60,000 gal., $128,400.

General Electric Co., 1405 Locust St., Philadelphia 2, Pa., items for use on mobile electric powerplant, $178,400; element assy. used on oscillator-filter unit, 334 ea., $27,952.

General Laboratory Associates, Inc., 17 E. Railroad St., Norwich, N. Y., ignition components, parts for J48/57-P1 engines, $29,884.

B. F. Goodrich Co., 500 S. Main St., Akron 18, Ohio, boot de-icer, plug and sleeve, $299,038.

Sherwin-Williams Co., 325 N. Broad St., Philadelphia 3, Pa., primer, zinc chromate, 82,711 gal., $208,470.

Henry Spen & Co., Inc., 1995 Pitkin Ave., Brooklyn 7, N. Y., ground handling equipment, $39,585.

Sperry Gyroscope Co., Great Neck, Long Island, N. Y., indicators, $216,528.

M. Steinthal & Co., Inc., 222 Fourth Ave., New York 3, N. Y., pilot's safety belts, $72,600.

Turco Products, Inc., 6135 S. Central Ave., Los Angeles 1, Calif., compound, paint remover, 127,560 gal., $160,170.

United Aircraft Corp., Hamilton Standard Div., Windsor Locks, Conn., various assys. for use on HSD propellers, $309,-769; spare parts used on P&W engines, $134,173; material for J57-P9 engines, $92,874; material for use on HSD propellers, $519,219.

United Aircraft Corp., Pratt & Whitney Aircraft Div., East Hartford 8, Conn., material for use on J48-P6A and -P8 engines, $71,010; material for use on J57-P7 engines, $35,455; spare parts for support of P&W engines, $3,443,698; material for use on R4360-59 engines, $145,276; material for use on R4360-59 engines, $3,769,187; spare parts for support of J57-P11 engines, $1,533,597; spare parts for P&W engines, $31,639; material for use on J57-P7 and -11 engines, $83,-986; material for J48-P5 engines, 380 ea., $74,807; spare parts used on P&W engines, $532,685; material for P&W engines, $45,042; material for use on P&W engines, $173,812; crankshaft, shaft and master rod assys., $608,498; material for J48-P5 engines, $266,602; material for use on P&W J48-P5 engines, $409,943; spare parts used on P&W engines, $35,323; material for P&W engines, $180,153.

Gas Turbine Starts B-52's Giant Turbojets

The portable carts in the foreground each carry a small Boeing 502 gas turbine adapted to start the eight big P&WA J57 turbojet engines powering the Boeing B-52 Stratofortress bombers being tested at Seattle, Wash. In foreground is XB-52, to the left rear is the YB-52. Two types of these ground power units are being made by Boeing: a single-engine setup delivering 140 air horsepower and a twin-engine unit of 280 hp. The latter, complete with engines and two compressors, fuel tanks, batteries, starting systems and instrument panels, weighs in at 2,600 lb., compared to a 57-hp. six-ton commercial predecessor. In the twin-engine model, one unit starts the J57; the second provides air pressures for testing the plane's systems before takeoff.

SEEING EYE, a new General Electric surveillance radar, called "most powerful airborne set ever built," is housed in the bulbous belly radome of RC-121C Super Constellation. In combination with height-finding radar atop fuselage, GE radar enables Navy and Air Force flying picket stations to extend vision of ground-based radar stations beyond their line-of-sight range.

GE Builds Far-Seeing Air Radar

TWICE AS POWERFUL as previous search radars, according to GE, set weighs two tons, including antenna with large azimuth radius of curvature designed to provide good definition for spotting enemy aircraft. Radar can also be used for anti-submarine patrol, navigation, weather mapping.

RADAR INDICATORS, shown in assembly at GE's new Utica, N. Y., plant, and other portions of the equipment, make wide use of printed-circuit sub-assembly type construction. Predecessor equipment was developed jointly by GE and MIT.

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► **Radar Display In 3-D**—"The Role of Stereo in 3-D Radar Indicating Systems" is the title of a paper scheduled for presentation at the national IRE convention in New York, Mar. 22-25. The paper, by Walter R. Tower of Sperry Gyro, will be given Mar. 23 at the afternoon session sponsored by the professional group on Aeronautical & Navigational Electronics.

► **RTCA Recommends SSB Development**—Development of a single-sideband aeronautical radio telephone system for air-to-ground communication in the 2-24 mc. band is recommended by Special Committee 65 of the Radio Technical Commission for Aeronautics in Paper 6-54/SC-65-7. SSB is expected to double number of usable channels, improve signal transmission. RTCA recommends upper-side-band for transmission and use of a suppressed carrier mode of operation.

► **Tinkertoy Cuts Costs**—A Project Tinkertoy type of automatic factory can cut the cost of producing electronic equipment by 44%, compared to present fabrication methods, according to a study conducted for the Navy by Mead Carney & Co., Inc., management consultants. This saving in production expense is based on amortizing the cost of the automatic factory equipment over a period of 10 years.

► **Mag Amp Solution Found**—Collins Radio has very recently developed magnetic amplifiers which will enable it to completely replace all vacuum tubes in its new airline autopilot, after it earlier appeared that a few tubes would be required (AVIATION WEEK Feb. 8, p. 61). Collins plans to have pilot-line models available this fall.

► **New VHF Helicopter Antenna**—Aircraft Radio Corp., Boonton, N. J., has developed an inverted "L-shaped VHF antenna for belly mounting on low-slung helicopters. New A-12 antenna is broadbanded to cover 118 to 148 mc. band, has VSWR under 2 up to 144 mc., and 2.7 at 148 mc., company says. Antenna is reportedly small enough to fit smallest two-place helicopters, will withstand mild icing and 250-mph. speeds.

► **Dalmo Victor Sold**—Stock holdings of Dalmo Victor Co., one of the nation's major producers of airborne radar antennas, have been purchased in entirety by Textron Inc., large textile manufacturer. Stock was privately held by Dalmo Victor officers.

—PK

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Less than ¼ cu. ft. of space required for mounting.	✓				✓
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Hi-Lo sensitivity switch, permitting pickup of weak signals or suppression of overly strong or spurious signals.	✓	✓	✓	✓	
Aural and visual sensitivity individually adjustable to pilot preferences and to various installations.	✓	✓	✓		
Cost under $600.00.	✓			✓	✓
***Only the Lear Marker Beacon Receiver combines all these features**	12	8	6	7	5

New Hose Meets Tough Jet Demands

• Resistoflex product is practically immune to chemical attack, is light, stands up under heat.

By George L. Christian

Belleville, N. J.—Resistoflex Corp. has developed a new type of aircraft hose which is better than the standard MIL-H-5511 hoses, yet sacrifices nothing for its advantages, according to the company (AVIATION WEEK Feb. 1, p. 61).

▶ **Significant Advantages**—Called Fluoroflex-T R-500 Hose, the new Resistoflex product has, in a single advance, achieved these significant advantages, Resistoflex says:

• **Temperature range.** It has more than doubled the temperature range under which flexible aircraft hose can operate.

• **Chemical resistance.** Its chemical resistance is such that the tube stock is completely unaffected by any known type of fuel, oil or acid within the temperature ranges of the hose.

• **Weight.** It cuts weight almost in half (46.8%), comparing an average of all sizes with standard MIL-H-5511 hose.

• **Size.** Its outside diameter is considerably smaller (average of 26.6% for all sizes) than standard hose for any given inside diameter.

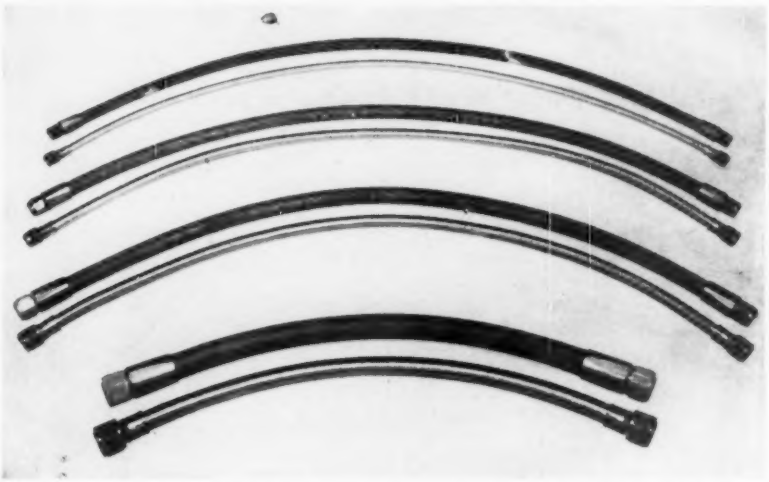
• **Life.** It retains virtually all its flexibility and strength throughout its entire temperature range (—100 to 450F), has practically unlimited operating life, and may be "left on the shelf" almost indefinitely without deterioration.

• **General resistance.** It is unaffected by reasonable heat or cold, is immune to moisture, salt water, fungus growth, dust or grit.

▶ **Teflon Specialty**—Although R-500 does cost more than its MIL-H-5511 equivalent—possibly twice as much—the fact that it has an operating life easily double of that hose, turns this debit into a potential credit, Resistoflex claims.

Basic ingredient of the new hose is du Pont's product, polytetrafluoroethylene, or Teflon, specially compounded to bring out the good and suppress the bad features of the synthetic material for this application.

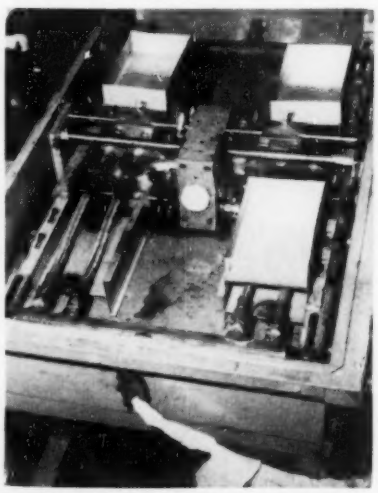
▶ **For Hotter Jets**—In early 1951, it became apparent to Resistoflex engineers that jet aircraft engines' operating temperatures were going up rapidly. So were the temperatures of the fuel and oil lines—fuel lines because of "soak" temperatures after engine shutdown, oil temperatures because of the increasing operating temperatures of the engine itself.



COMPARISON between new and old types of hose, shows that in each size the Resistoflex R-500 (lower hose in each pair) is smaller than the standard MIL-H-5511 unit.

Moreover, to overcome the problems of providing an oil which would retain its lubricity at the new, high operating temperatures of these engines, yet remain liquid enough not to congeal at the low temperatures to which the engines might be subjected under arctic conditions, petroleum companies were forced to go to synthetic lubricants.

Some of these, such as Standard Oil's Esso Turbo Oil 15 (AVIATION WEEK Apr. 27, 1953, p. 72) have deleterious effects on synthetic rubber hoses used under specification MIL-H-5511. (Under this spec, hoses up to size 16 are made of buna-N; sizes 16 and over of Neoprene.) Jet fuels, such as JP-4, also raise hob with synthetic rubber fuel lines. Neither synthetic oils nor JP-4 have any effect on R-500 hose, Resistoflex says.



VIBRATION TESTS at high temperatures helped prove out new jet hose.

Another advantage is that, by using R-500, a single type of hose may be used throughout the engine, instead of the current practice of using more than one type, depending on the application. In at least one modern jet engine, because of high operating temperatures, no rubber hose is used at all.

▶ **Better Than Promised**—Engineers of a large jet engine manufacturing plant, who have been running laboratory tests with R-500, say that the hose has not only lived up to the Resistoflex claims, but has exceeded its spec in many cases. They say the product is what they have been looking for—a hose conceived and developed from the outset for jet engine requirements instead of being basically a hydraulic hose, as the MIL-H-5511 hoses are.

They checked the R-500 product to their own requirements instead of those set up by Resistoflex, since theirs were tougher. This is how they expressed their reaction to the tests: "We found nothing bad with the Resistoflex hose."

▶ **User's Tests**—Among some of the engine manufacturer's conclusions were:

The hose exceeds requirements in

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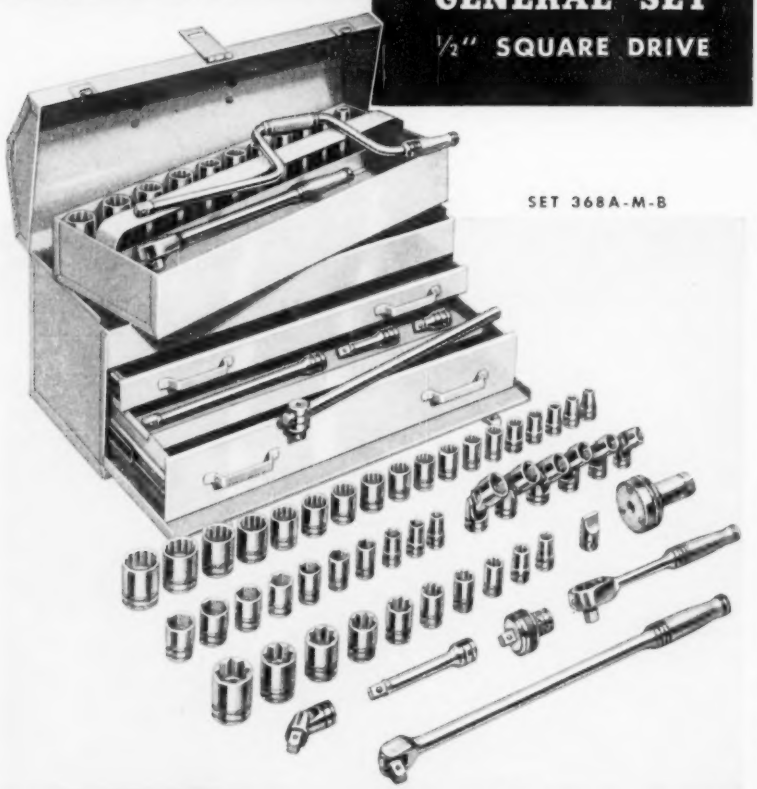

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RESISTOFLEX R-500 hose burst under 7,700 psi. at 450F fluid temperature.

conveying hot, dry air as experienced during the soak period immediately after engine shutdown. These very hot soak periods cause rapid deterioration of synthetic rubber hoses, but the R-500 hose takes the extreme heat without adverse effects.

Although of Teflon base, the hose does not have the cold-flow characteristics of commercial Teflon. The latter would tend to cold-flow and extrude through even small openings at the soak temperatures of modern jet engines.

"R-500 does not cold-flow to any appreciable degree at the temperatures encountered," say the engineers.

► **Does Not Oxidize**—The non-oxidizing characteristics of the hose, making it impervious to attack by synthetic oil or fuel, will certainly prolong the life of engine hose, although the engine maker has not had sufficient experience with the product to predict a life expectancy for the material.

Although Teflon is not as readily bendable a material as synthetic rubber, the R-500 hose has bending radius characteristics equal to rubber hose. Reason is that the former has a thinner wall thickness, thus has less material to displace, making bending easy. This simplifies installation problems.

R-500's high heat resistance is another important consideration mentioned by the engine maker. While MIL-H-5511 hose cannot be used in applications where temperatures exceed 300F, and should preferably not be used above 250F, the engineers feel that R-500 can be used comfortably at temperatures up to 500F. They say that even 600F is acceptable, but this temperature should not be exceeded, because the material deterioration temperature is 623F, at which point it begins to emit noxious gas fumes.

The engine maker says that if, in comparative engine tests it is running on MIL-H-5511 and Fluoroflex-T hoses, the latter live up to expectations, their installation on future production jet engines will be strongly considered.

► **What It Will Do**—Here are details of how Resistoflex's Teflon hose stands up to heat, according to the firm's chief engineer, Irving D. Press:

R-500 will withstand temperatures from —100 to 450F. Hose remains flexible at both temperature extremes—

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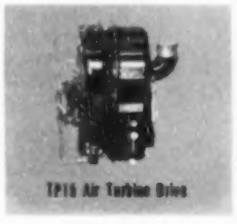

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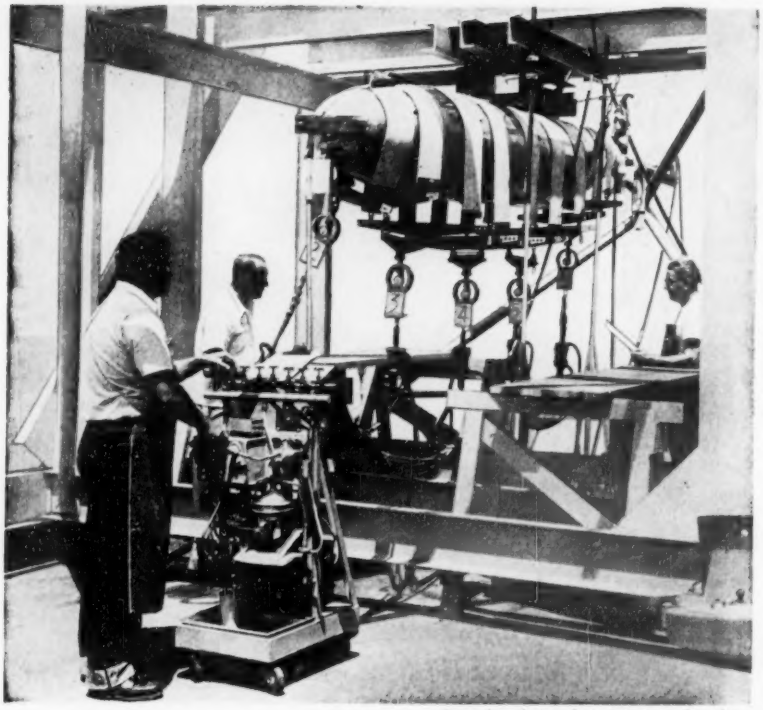

Pastushin-designed static test stand applies 20-ton "squeeze" to jettisonable fuel tanks

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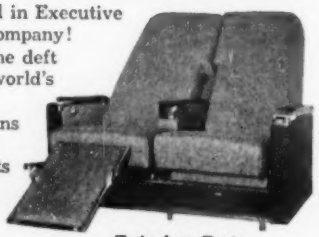

Twin Aero-Rest

BURNS AERO SEAT CO., INC.

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P. O. Box 127
Burbank, California

actually there is little difference in its flexibility between these two ranges. (This reporter tried bending a 2-ft. length of R-500 that had been soaked in a cold box at −112F and found it almost as pliable as a piece of similar length and diameter which was at room temperature.) Also, R-500 hose retains a large margin of its burst resistance at the two temperature extremes.

Resistoflex is confident that the hose will operate satisfactorily to at least 500F, may possibly go to 600F. To test the hose's thermal shock resistance, oil under pressure and heated to 450F was pumped through assemblies of R-500 hose which had been soaked at −100F and were held at that low temperature. The maker reports that not a single assembly failed.

► **Steel Fittings**—For temperatures over 300F, Resistoflex uses high-strength steel instead of aluminum fittings. Hose assembly designation is R-3800. This R-3800 hose has withstood such tests as being vibrated at 2,000 cpm. to an amplitude of ¾ in. with 450F oil flowing through it.

At the other temperature extreme, R-3800 hose was soaked at −100F, bent through a specified radius and proof-pressure-tested with both the fuel and oil without failure. These tests were particularly severe since the particular hose assembly involved had had a long history of exposure to 450F temperatures, both inside and outside of the hose assembly, Resistoflex points out.

► **Chemical Resistance**—R-500 hose is almost completely chemically inert, is wholly unaffected by any known fuel, oil (both petroleum or synthetic base), alcohol, or acid, including red or white fuming nitric widely used in missiles, according to the firm.

Resistoflex has filled sample sections of hose with both red and white fuming nitric acid and kept the samples for weeks at zero outside pressure and at room temperature with absolutely no permeation of the inner tube, the manufacturer told AVIATION WEEK.

The hose will handle corrosive fluids as long as they remain within its temperature operating limits. Resistoflex says that the only known substances to attack R-500 are molten alkali metals and chlorine trifluoride at high temperatures. This makes the substance useful not only for all hose applications, but points towards wide use as gasket material, shaft packings, etc.

R-500 hose will convey any known acid singly, and can carry any combination without effect on the inner tube, Resistoflex claims.

This chemical inertness points to a corollary advantage of being able to use a single type of hose in any given application, although several different types of fluid with varying chemical

DONNER SERVO Accelerometers

TWO NEW PRECISION INSTRUMENTS FOR MEASURING LINEAR and ANGULAR ACCELERATION

Here is a family of accelerometers which are small enough individually to lie in the palm of your hand—yet capable of measuring either linear or angular acceleration to four significant figures! Based on developments by scientists of the Naval Ordance Test Station at Inyokern, California, each instrument incorporates a miniature servo system which automatically generates a current to counterbalance torque arising from acceleration. The current developed is proportional to acceleration within approximately 0.1% over the entire operating range, and goes precisely through zero at zero acceleration without drift or hysteresis. In one model, error due to friction has been measured as approximately 0.0002 g.

Angular and linear accelerometer types are alike in basic operation and are supplied in identical containers, each smaller than a three inch cube. Both instruments are rugged and suitable for airborne use, where they may serve functions in navigation, guidance and control, telemetering, physiological studies, g-loadings and control and vibration studies. Laboratory applications include their use as standards for checking and calibrating other transducers.

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STABLE: No zero drift . . . . . .

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HIGH FREQUENCY RESPONSE: Flat to approximately 100 cps. or cut-off at a lower frequency if desired . . . . . .

RANGE: Standard ranges up to 12 g. Higher ranges available on special order . .

HIGH-LEVEL OUTPUT: Precise calibration of 10 volts (or more) per g, current of several milliamperes . . . . . .

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RUGGED: Suitable for airborne applications.

NEGLIGIBLE TEMPERATURE EFFECTS: Calibration change over extreme temperature range approximately 0.1%. Temperature compensation readily incorporated.

SIMPLE: All functions performed with a single vacuum tube. (Special models available with ruggedized, sub-miniature tube.)

SMALL: Volume less than a three inch cube.

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corrosion characteristics might have to be conveyed in one installation.

▶**Lighter and Smaller**—R-500 is considerably lighter than comparable MIL-H-5511 hose, according to Resistoflex. Here are some figures they have published in a technical engineering report:

• **Weights.** A linear foot of MIL-H-5511 hose, size 4 (¼ in. i.d.) weighs 0.171 lb. Weight of size 4 R-500 hose is 0.065 lb., giving the Resistoflex product a weight saving of 62%. The —4 size gives the greatest weight saving.

Smallest weight saving is in the next-to-the-largest size, —20 (1¼ in. i.d.). Here weight reduction is 26% from MIL-H-5511 hose.

Average reduction over nine sizes ranging from —4 to —24 (¼ in. to 1½ in. i.d.) is 46.8%—an appreciable figure when the amount of hose used on modern jet engines is considered.

• **Thicknesses.** Because R-500 hose inner tube wall thickness is thinner than that of MIL-H-5511 hose, its outside diameters are appreciably smaller for any corresponding inside diameter. The report lists these comparative figures outside diameters:

In the —4 size, MIL-H-5511 hose has an o.d. of 0.516 in. and R-500 an o.d. of 0.313 in., giving the latter a 39% saving in outside diameter. This saving diminishes gradually as size increases.

At maximum size of —24, the figures are 1.750 in. o.d. for MIL-H-5511 hose and 1.510 in. for the R-500, giving a 14% o.d. reduction for the latter. Average of the nine sizes gives R-500 an advantage of 26.6%.

▶**Burst Pressure**—R-500 hose has the same burst pressure and fire resistance characteristics as are found in MIL-H-5511 hose.

Working pressure for all sizes, from —4 to —24 is 1,000 psi. Burst pressures run from 15,000 psi. in the small —4 size to 4,000 psi. in the large —24 size.

▶**Fire Resistance**—A fire-resistance test was performed at a government agency using equipment specifically designed for this purpose.

In this test, hose is placed in the tester so that a 2,000-deg., 6-in.-dia. flame impinges on one end of the hose, engulfing one fitting and some 6-8 in. of the hose adjacent to the fitting. Flame nozzle is 4 in. from the hose.

During the fire-resistance test, the hose assembly is vibrated at a frequency of 2,000 cpm. with an amplitude of 5/32 in. About 5 deg. of torsional deflection is introduced along with the vibration. The hose did not fail in this test.

▶**Other Tests**—Here are some other tests to which R-500 hose assemblies were subjected and the results:

• **Coupling leakage test.** No failures in all tests.

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• **Proof pressure tests.** No failures in all tests.

• **Vibration tests.** After vibration test of 2,000 cpm. at ¾ in. amplitude, lines passed 1,500-psi. proof pressure test with no evidence of failure.

• **Combined fluid immersion and high ambient test.** In twin tests, oil temperatures varied from 400F - 450F to −40F. Oil at 400 - 450F was replaced periodically with oil at −40F. Ten 5-min. proof-pressure tests were run at pressures of 600 psi. (three at 1,500 psi.). Duration: 1,000 hr. Result: no failures.

• **Circulating oil test.** In twin tests, oil temperatures of 400 and 450F were used; ambient temperature in both cases, 350F; pressure, 100 psi. After 150 hr., hose pressure tested at 1,500 psi. at room temperature. Then hot oil circulation continued for 2,000 hr. with proof-pressure tests accomplished about every 200 hr. Result: no failures.

• **High-temperature burst pressure test.** Lines from the circulating oil test were used. Size was–10 (⅝ in. i.d.) Oil, circulated at 450F and 60 psi. for one hour, then pressure increased until lines failed. The two lines burst at 7,700 psi. and 7,500 psi. respectively. Room temperature burst pressure rating of the –10 size hose is 7,000 psi., slightly lower than the actual high-temperature burst pressure.

• **Impulse test.** Performed according to MIL-H-5511, except that hose assemblies were oil-aged for seven days by immersing in MIL-L-7808 oil at 400F. Result: no failure.

• **Fuel immersion and cold bend tests** revealed no failures, while volumetric expansion test showed a cubic expansion of 0.368 cubic centimeters per inch of free length compared to a volumetric expansion of 0.436 cc. in. for MIL-H-5511A-10 hose.

▶ **Other Advantages**–Resistoflex engineers cite these additional advantages of R-500 hose:

• **Stainless steel braids.** Not only is the Teflon-compound hose non-oxidizing inside and out, but the stainless steel braid is made of the high-chrome-content-type 304 stainless, making the braid highly resistant to corrosion.

• **Amorphous material.** Fluoroflex-T R-500 material being an amorphous material, it is almost immune to vibration and fatigue failures.

• **Non-oxidizing material.** Being made of non-oxidizing material, the hose assembly has practically unlimited shelf life, even if stored in humid, salt-saturated atmospheres.

• **Field assembly.** Fittings are designed to permit easy assembly in the field.

▶ **Designations**–Resistoflex has assigned these designations to its different types of R-500 hose assemblies:

• **The basic types,** with steel fittings for high temperature use, carry no suffix.

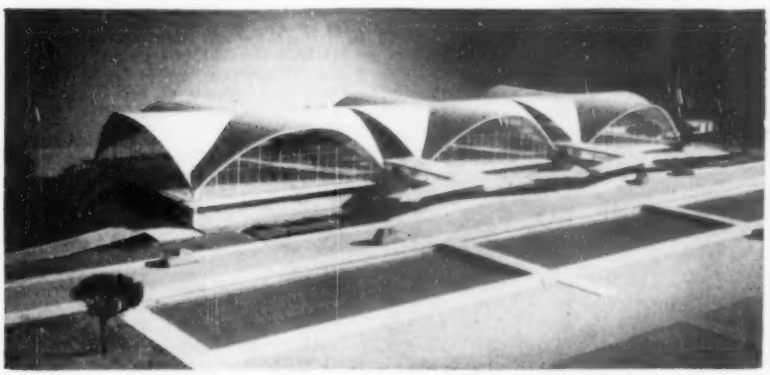
• **The lightweight types,** for use with aluminum fittings, use the suffix DD.

• **Types for acid service** carry the suffix CC.

Sizes now available run from ¼ to 1 in. Also, 1¼ and 1½ in. sizes will be available later on this year.

▶ **Into the Future**–Resistoflex engineers are confident that they have come up with a hose that will meet all the stringent needs of current jet engines. And it will meet the demands of the immediate future.

Resistoflex is now making R-500 hose in limited production quantities. Large expansion of production facilities is contemplated with the construction of a new plant, now under way.



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Inasmuch as the 21st Annual Inventory issue will be a record one in terms of Industry usefulness, Military and Government reference, all companies Manufacturing for or serving the Aviation Industry are urged to be represented in this edition.

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Why $12,000 to $20,000 Jobs Are the Easiest to Get Today

Here Are Some Surprising Facts About the Serious Shortage of High-Salaried Executives—and What You Can Do to Qualify for the Top-Level Jobs That Are Open Right Now

SURPRISING as it may seem, the really big jobs today are the hardest to fill—and the easiest to get. You don't have to look farther than the want-ad columns to prove this fact for yourself. Men who can handle top-management jobs can now choose from any number of openings that pay $12,000 . . . $15,000 . . . $20,000, and more.

Such men are becoming hard to find. WHY? The acute shortage has been variously explained by the war years, the rapid expansion of industry, the tendency to specialize. The important thing is not why the shortage exists but WHAT you can do about it, and HOW you can qualify for the great opportunities that exist in business today.

As one of the foremost business consultants in the U. S. and the head of a leading accounting firm, J. K. Lasser works with some of the nation's leading corporations. He has seen at first hand the scarcity of qualified men for high-salaried jobs. Why, Mr. Lasser asked, are there so many openings at the top—and so many men stymied in the $5,000 to $10,000 a year bracket?

The One Ingredient That Qualifies You for a Top-Salary Job

To find the answer, Mr. Lasser went directly to the heads of companies in many fields. Consistently he heard the same answer: the one thing men in the middle brackets need to make the high-salary grade is—a general, well-rounded knowledge of business procedure. "Give me a man with a basic knowledge of accounting, marketing, and employee relations," one employer remarked, "and I'll lead him by the hand to a $20,000 office!"

J. K. LASSER

Featured in FORTUNE MAGAZINE as one of the nation's foremost authorities on business and taxes. Mr. Lasser is head of one of the best known accounting firms in the United States and Adjunct Professor and Chairman of the Institute on Federal Taxation at N.Y.U.

This simple answer gave Mr. Lasser an idea for a brand-new plan that would literally lead men out of the $5,000-$10,000 plateau and into the top jobs. He asked the foremost men in every field to reveal working methods that have brought success in marketing, public relations, accounting budgeting, insurance, and "know-how" in every business procedure for top-level management.

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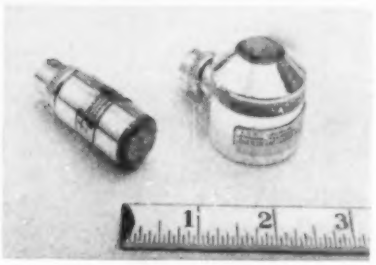

Crystal Transducers Help Gage Metal Thickness

Branson Instruments, Inc., is introducing a new series of ½-in.-diameter crystal transducers for ultrasonic thickness gaging with the company's Audigage testers.

Branson reports the efficiency and small diameter of these Type B transducers permit precise thickness measurements on metal of sharply tapering section, compound curvature, and other unusual conformations that formerly prohibited accurate measurements.

Units have both quartz and barium-titanate ceramic as active elements, and are said to have a sensitivity approximately equal to that of the conventional 1⅛-in.-diameter all-quartz probes.

Because of their small contact area and high energy output, the probes can be used on such difficult objects as knuckle bends, pipe elbows and deeply grooved or heavily corroded areas.

All units in the series are fitted with quartz wearplates for mechanical protection. They are available in straight or right-angle mountings and are directly interchangeable with standard probes.

Branson Instruments, Inc., 430 Fairfield Ave., Stamford, Conn.

Device Gives Safety Belt Two-Way Strength Test

Rose Manufacturing Co. has come up with means of testing safety belts, not only for their breaking point but also for amount of kinetic energy absorbed.

Making use of a W. C. Dillon & Co. dynamometer as the measuring device, the system involves a hoist suspended from a tripod which exerts a pull against a safety belt positioned around a drum. Drum in turn is bolted in series with dynamometer, with entire assembly anchored to base of tripod. Drum simulates pressure caused by body against safety belt.

Steel tape is fastened at anchor point and is attached to top of tripod by a wire. Slow motion camera records both

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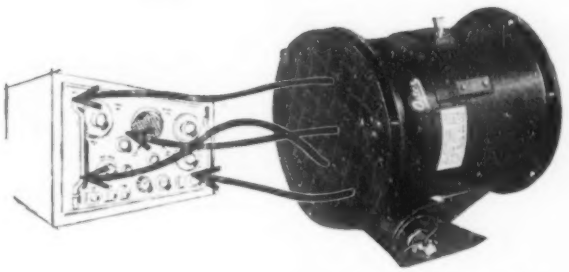

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poundage of dynamometer dial as tension is increased and extension of tape as pull is exerted and belt stretches.

In this way, accurate reading reportedly is provided of kinetic energy expended against belt and ability of belt to withstand shock, also showing its actual breaking point.

W. C. Dillon & Co., Inc., P. O. Box 3008, 14620 Keswick St., Van Nuys, Calif.

Relief Valve Safeguards Pressurized Equipment

Safeguarding of pressurized radar and other electronic or tank equipment in aircraft is reportedly accomplished with an isobaric relief valve for low-pressure air systems being offered by Lear-Romec division of Lear, Inc.

Altitude and extreme temperatures have no effect on blow-off pressure, says Lear. Metallic diaphragm balances out effect of atmospheric pressure, so relief valve opens at exact preset system pressure at different altitudes. Metal construction of diaphragm is built to withstand temperatures ranging from −60 to 165F.

Valve has only one connection to air system and is easily adjusted for blow-off pressure. Tube connection port is ¾-20NF-3 thread per AND-10056, style E. Exhaust opens to ambient air.

Unit has adjustable pressure range of 25 to 40 psi. absolute. Other specific pressure ranges are obtained through substitution of diaphragms with specially rated springs. Cracking and reseating is accomplished within 2 psi. of setting, the company says.

Weight of valve is 0.25 lb. Designation is Model RD-10280.

Lear-Romec division, Lear, Inc., Elyria, Ohio.

ALSO ON THE MARKET

Aircraft internal wrenching bolts—diameters 1 in., 1⅛ in., 1¼ in., 1⅜ in. and 1½ in.—have been added to line of military items made by Standard Pressed Steel Co. They are made of aircraft alloy steel, heat-treated to 160,000 to 180,000 psi. tensile. Fillet area under the head is cold-worked and rolled threads are fully formed after heat treatment. All are cadmium plated.—Standard Pressed Steel Co., Jenkintown, Pa.

Wire screw thread insert kit, No. 34CS, contains an assortment of 25 inserts in the four commonly used sizes. Tools necessary for the wire insert method of thread repair are included. Firm plans to distribute larger kits in the near future.—Heli-Coil Corp., 1476 Shelter Rock Lane, Danbury, Conn.

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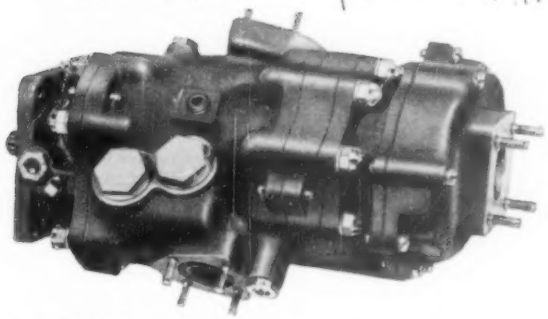

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Airlines Fight S&WA Cargo Certification

- **Carriers bidding for North Atlantic freight rights join forces to block CAB approval of Seaboard application.**
- **Transocean argues several U. S. lines are needed to halt domination of the market by foreign companies.**

By Frank Shea, Jr.

The seven-year-old airline battle for trans-Atlantic cargo rights has flared anew, with the fight centered on Seaboard & Western Airlines' efforts to justify its right to certification in the face of heavy attack from virtually all carriers involved.

Here are developments that followed recommendation of Seaboard for trans-Atlantic all-cargo certification by Civil Aeronautics Board examiner Herbert Bryan (AVIATION WEEK Jan. 18, p. 84):

• **Transocean Air Lines** flatly predicted that, if certificated, S&WA will not survive one year's operation over the North Atlantic routes with its present fleet.

• **Trans World Airlines** called upon CAB "to maintain the same realistic attitude displayed in two previous instances when the Board voted unanimously against certification of an all-cargo operator," holding that there is nothing to justify an all-cargo certificate for Seaboard except "an agile imagination" and "fantastic" claims the carrier has advanced in its bid for certification.

• **Pan American World Airways** said S&WA's proposal is based on the "pipe dream" that European airlines and their governments will permit lowering of trans-Atlantic cargo rates by 60% when previously they have been unwilling to agree to much smaller cuts.

• **European-American Airways** and Overseas National Airlines, also applicants for certification, held that CAB decision in favor of Seaboard would, in effect, be "rewarding a violator"—referring to an enforcement case against S&W several years ago (AVIATION WEEK June 12, 1950, p. 12).

All views were presented in oral argument before CAB, with Seaboard standing alone in the face of heavy opposition from all directions. Nearly all other applicants, also opposed by Pan American and TWA, seem to have temporarily joined forces with these major carriers in a combined effort to meet the problem at hand—prevention of Seaboard's certification.

▶ **Flag line needed**—Bryan, in recommending decision in favor of the airline, held that a U. S.-flag airfreight line is needed but said more than one such competitor would weaken chances of success for all. S&WA was his choice largely on the grounds that "Seaboard appears to be the most able of all the applicants to develop the trans-Atlantic cargo potential."

Bryan had cut the number of applicants to three—Flying Tiger Line, Transocean and S&W. He eliminated Flying Tiger because all its commercial experience has been in domestic markets, and FTL management would be preoccupied with the Slick Airways integration (AVIATION WEEK Jan. 18, p. 80) and continued exploitation of domestic markets.

Transocean also was eliminated because of its involvement in enterprises (largely in the Pacific) "far removed from the trans-Atlantic air cargo field." Bryan had also reasoned the airline's far-flung network of air and ground operations is "so varied and extensive that it must be concluded that they require considerable attention of management."

▶ **Cargo Potential**—Bryan proposed that S&W be certificated for five years, cargo only, between the U. S. (New York, Philadelphia and Baltimore) and Europe (England, Netherlands, Belgium, Germany, France and Switzerland), via Newfoundland and Ireland.

An air cargo potential exists in the amount of 62.3 million lb. per year over trans-Atlantic routes, Bryan estimated.

▶ **Foreign Domination** – Transocean holds that this estimate is essentially a conservative one and that certification of several new U. S. all-cargo carriers in the trans-Atlantic market will "halt the increasing domination of foreign air carriers . . . without cost to the taxpayers."

The nonsked argued before CAB for certification for two all-cargo lines, one to serve northern Europe and the other to serve central and southern Europe.

Transocean says it "is the most fit and able among the six applicants" and "the only non-certificated applicant . . . equipped to conduct all phases of the proposed service." The carrier contends Seaboard's proposals are "wholly unrealistic," and the need for more than one all-cargo carrier would be particularly acute if S&WA is approved for certification.

▶ **Pure Hypotheses**—TWA attacks every one of the major elements in Seaboard's proposal—volume, rates, loads and expenses—as "pure hypotheses, completely without substance."

Seaboard, says TWA, alternately adjusts its computations upward and downward in trying to prove its case. Despite the absence of evidence, the airline continues, S&W seeks to convince the Board:

• Present traffic would triple immediately.

• It could operate at costs substantially lower than any other carrier.

• It could realize a 70% load factor, "ignoring the severe seasonal and directional characteristics of the North Atlantic route."

▶ **Rate Proposals**—Pan American, in hitting at S&W's rate proposals, points out it took PAA four years to put across its program of passenger tourist fares on the Atlantic, with only a one-third reduction.

Henry J. Friendly, PAA's attorney, cites another case when the airline filed a tariff instituting a 25% reduction in trans-Atlantic cargo rates.

"The Board requested us to withdraw the tariff immediately because of fears that foreign governments would protest," says Friendly.

"Yet here you are being asked, to certificate a carrier whose entire program depends on making a 60% reduction in cargo rates effective immediately."

Pan American further held:

• In certifying Seaboard, CAB would have the U. S. "walking on both sides of the street" in its international aviation relations—on one side exhorting PAA and TWA to use moderation, to observe the sensibilities of foreign governments and endeavor to avoid demands for consultation under bilateral agreements, and on the other side placing a carrier in the market "whose program depends on alone carrying across the Atlantic three-fourths as much cargo as has been carried by all lines in the past at rates which every major government in Europe would regard as a challenge to the economic well being of its national airline and something to be resisted at all costs."

• S&WA also could not afford to put the proposed 18-cents-a-ton-mile rate into effect, since "experience has shown

trans-Atlantic costs in general to be 85% higher than domestic."

• Seaboard would be forced to charge at least 30 cents per ton-mile and, on its own traffic estimates, there was not enough cargo available at this figure to support the service without seriously injuring existing carriers.

• Government would be forced to increase present subsidy payments to certificated U.S.-flag carriers if S&W were to enter the field because of the business that would be diverted to the cargo airline.

▶ **Firm Stand**—Meanwhile, Seaboard stands firm on its proposal. In addition to the service recommended by examiner Bryan, S&WA also hopes to be certificated to serve these other countries listed in its original application: Scotland, Luxembourg, Austria, Italy, Czechoslovakia, Greece, Egypt, Syria, Palestine, Iraq, Iran, Kuwait and Saudi Arabia.

In addition to airfreight potential in the Middle East, S&WA also claims its economic studies show that trade with Austria, Italy, Greece and Czechoslovakia accounted for 16% of the total European cargo potential.

Since the airline filed its application for a trans-Atlantic all-cargo certificate in July 1947, 70 days have been devoted to hearings, encompassing more than 8,500 pages of testimony and hundreds of exhibits. The reopened hearings should add substantially to this total.

PAL May Drop Overseas Routes

New Philippine administration calls cost of competing on international airways too expensive for flag line.

(McGraw-Hill World News)

Manila, P. I.—Philippine Air Lines, faced with mounting losses on international operations, may be forced by president Ramon Magsaysay's new administration to drop its overseas routes.

The president's Council of States has decided PAL, 62% owned by the government, should improve and expand its domestic air services rather than buy new equipment necessary to compete on international airways.

▶ **Increasing Costs**—To maintain a competitive position on overseas routes, Magsaysay says the Philippine-flag airline needs immediately four DC-7 transports costing $5 million, half of this amount payable with the order.

He adds that PAL cannot afford to overlook the arrival of jet airliners in civil air transport, estimating this probably will cost the carrier another $15 million during the next five to 10 years.

Money for DC-7s or jets would be appropriated by Congress in the form of additional capital investment in the airline or would be borrowed from private sources on a government guarantee.

▶ **$1.5-Million Subsidy**—The government has backed Philippine international operation with $1.5 million in annual subsidy by paying a flat airmail rate of 50 cents per ton-mile.

Because of losses last year on overseas services, PAL is pressing for a 25% increase in this subsidy. Revenues for 1953 were reversed from the previous year, showing a profit on domestic operations and a loss on international.

In addition to its increasing subsidy needs, the airline is in debt $3.1 million to banks.

▶ **Necessary to Defense**—The Council of States wants PAL to build up domestic routes because the government believes a strong internal network is necessary to national defense.

Extension of services to hitherto neglected areas in the islands also is expected to stimulate their rapid development.

Defense requirements are behind a plan to enlarge and modernize the airport at Cebu.

▶ **Congressional Fire**—Philippine also is under fire in Congress. A House committee has called the airline to testify on an act signed into law by former president Elpidio Quirino that exempts "new and necessary" industries from all taxes for a period of 10 years.

PAL vice president Dan Gomez says he does not know whether the air carrier qualifies for the exemption, pointing out it would have little effect on the flag airline because PAL receives an exemption under a franchise passed by a former Philippine legislature.

But Gomez admits the airline might collapse if forced to pay such taxes as a 17% assessment on imported aviation fuel and spare parts.

▶ **New Expenses**—PAL's expenses are expected to increase because of a Civil Aeronautics Administration order requiring each airline operating in the islands to employ at least one full-time medical examiner.

An executive order also is expected soon, calling for establishment, maintenance and operation of search and rescue services in accordance with requirements set up by International Civil Aviation Organization.

At present, these services are provided by U.S. Navy's Search-and-Rescue group, but ICAO does not recognize this arrangement.

NAA Would Give Up Registration Letters

North American Airlines has asked Civil Aeronautics Board to dismiss an enforcement proceeding in the interests of time-saving and economy.

The nonsked proposed instead that it surrender its present irregular air carrier letters of registration upon conclusion of three different certificate cases in which the airline has applied for permanent certificates of public convenience and necessity.

▶ **Avoid Duplication**—Reasoning is that the airline's operational fitness and ability under fire in the enforcement proceeding would be decided in the certificate cases. By eliminating the present proceeding, duplication would be avoided, airline officials say, as well as time and the expense involved in both enforcement and certificate proceedings.

The nonsked currently is involved in the New York-Chicago, Denver and Tulsa service cases.

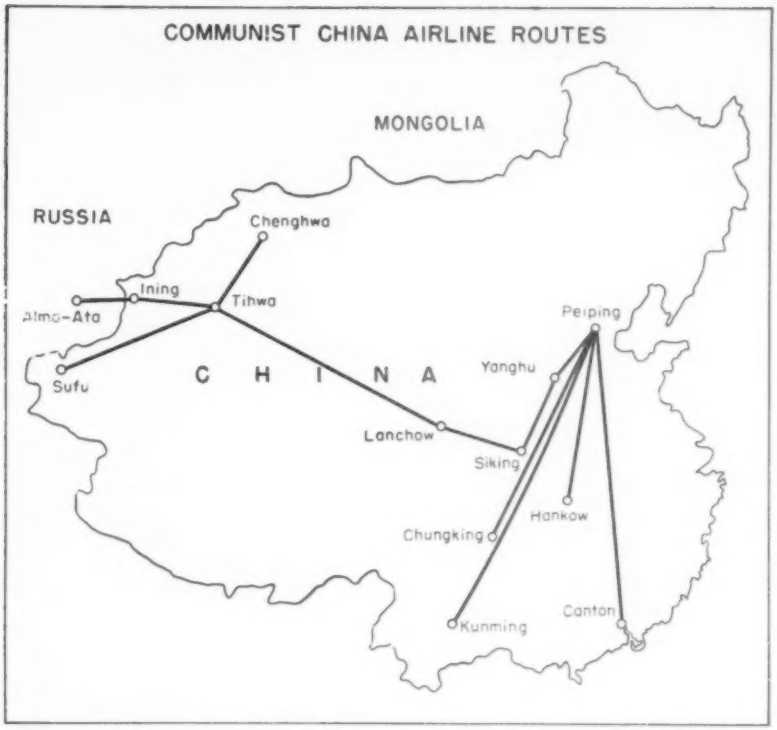
Stanley Weiss, secretary-treasurer of North American, says the airline's proposal would be "the only effective means of ensuring North American adequate Board consideration of its nationwide aircoach proposals."

▶ **Validity Issue**—"Our offer gives the Board an opportunity to settle this complex problem in a manner that is just to all concerned. North American would be given a proper chance to be heard on its application for permanent operating authority, the nonsked official says.

"At the same time, the Board would be assured that once the current certificate proceedings had been concluded, North American's present limited operating authority would be canceled and the lengthy and costly enforcement proceedings in which the principal issue is the validity of the Board's economic regulations would be avoided."

▶ **Dismissal Doubtful**—Weiss maintains CAB has ample precedent for granting the airline's proposed settlement. Several years ago, he claims, in the domestic airfreight case, the Board issued exemptions to carriers seeking airfreight certificates. When the proceedings were concluded, four certificates were awarded and the remaining exemptions were canceled.

Since the nonsked's proposal came so close to the date (Feb. 25) set for the enforcement hearing last week, observers were doubtful that the Board would dismiss its proceeding. If it did, CAB would have to modify its policy announced in September 1951 to the effect that nothing can defer an enforcement proceeding that decides whether or not a carrier is violating aeronautics law.



Russia Backs Red China Airlines

(McGraw-Hill World News)

Russia appears to hold a senior partnership in Communist China's civil airlines.

Sketchy details of the Peiping government's commercial aviation operations have appeared in the Russian publication Krilya Rodiny (Wings of the Fatherland). They reveal that Soviet technicians and advisers were instrumental in organizing Red China's Civil Aviation Administration in 1949 and still are prominent in the picture.

Moreover, main Chinese air routes now are tied directly into those of the USSR's Civil Air Fleet.

▶ **'Brotherly Friendship'**—The Russian article, written by V. Danilychev, chief of the International Aviation Communications Administration of the USSR's Civil Air Fleet, indicates the Soviet-Chinese Stock Company for Civil Aviation (Skoga), organized in 1950, is the main force in building Red China's airlines and airports.

Danilychev describes Skoga as "one of the finest evidences of brotherly friendship and economic cooperation between the USSR and the Chinese People's Republic."

Red China reportedly began regularly scheduled civil airline flights in August 1950. Danilychev says both passenger and cargo operations have expanded greatly during the past three years "despite the fact that the Chiang Kai-Shek forces removed most of the planes and equipment and destroyed the airports."

▶ **Route System**—Principal routes include: Peiping-Hankow, Peiping-Chungking, Peiping-Kunming, Peiping-Canton and Peiping-Kashgar (Shufu).

The Peiping-Kashgar link, stretching nearly all the way across China to the Russian border in Central Asia, is about 2,865 miles long. Intermediate stops are at Taiyuan (Yangku), Siking (Changan), Lanchow(Kaolan), and Tihwa, capital of Sinkiang Province.

Both Siking and Tihwa are important hubs for China's civil air network. Routes extend from Siking into southern China and from Tihwa north to Sharasume (Chenghwa) near the border of Russia's East Kazakhstan, and west to Kuldja (Ining) and Alma Ata, capital of the Soviet's Kazakh Republic, as well as to Kashgar (Sufu) gateway to USSR's Tadzhik Republic.

▶ **C-46 Fleet**—Danilychev does not disclose what equipment is being used by Red China's civil airlines or what schedules are maintained. He says, however, the 2,865 miles from Peiping to Kashgar were covered in 20 flying hours.

A picture accompanying the article shows a C-46 with Communist Chinese airline insignia undergoing maintenance, indicating that some Curtiss Commando equipment is being used by Skoga.

Nonsked Fight

- **ATA calls for regulation of irregular airlines.**
- **Attack touches off cries of sked 'propaganda.'**

Stanley Gewirtz, assistant to the president of Air Transport Assn., has sharply criticized nonscheduled airlines and called for uniform stringent regulations of the irregular industry.

"Regulation is necessary," he told an Aviation Writers Assn. luncheon. "It has been good for the country and it has been good for the industry. It must be uniform."

Gewirtz' attack brought immediate rebuttals from the irregulars, who labeled the speech "ATA propaganda."

▶ **'Easy Operation'**—It is easy to run an irregular airline, Gewirtz claims, because the nonskeds do not have to:

- Comply with safety provisions of Civil Air Regulations.
- Buy modern equipment.
- Serve 50 to 70 cities.
- Operate shorthaul routes.

Scheduled airlines spent $21 million in the year ending Sept. 30, 1953, for route surveys, radio communications networks, weather reporting services, pilot training qualification and refresher and airline-operated dispatch systems, he reports. They paid an additional $2 million to Aeronautical Radio Corp. for its services, he says.

These costs "are not imposed upon the irregulars" under Civil Air Regulations, says Gewirtz. "Whether these are required for reasons of absolute safety is a problem for the Civil Aeronautics Board and the Civil Aeronautics Administration to answer. What we in the industry know is that these things cost money, and we're happy to spend it."

▶ **New Equipment**—In the question of equipment, irregulars "don't have to use anything except leased or out-dated surplus equipment," the association executive says.

The scheduled industry, however, chooses to pay $800,000 for its Convairs and Martin 4-0-4s, $1.2 million for its DC-6s and its Connies and over $2 million for its DC-7s, Super Connies and Stratocruisers."

The ATA official also charges that "one large, irregular combine alone" in the first nine months of 1953, "provided regularly scheduled irregular nonscheduled service to about seven cities."

At five of the seven (Oakland, Los Angeles, Chicago, New York and Miami), he says, "they carried more traffic in and out than is generated at 82%

of the airports served by certificated carriers."

▶ **Hauls Compared**—Gewirtz describes as "nice transport work if you can get it" the average haul of 1,578 mi. made in the first nine months of 1953 by nonskeds. Average haul of the big four airlines was 528 mi., he reports.

The Big Four (Trans World, United, Eastern and American Airlines), he says, carried 13% of all its passengers more than 1,100 mi., against "one irregular combine's" carriage of 80% of all its passengers more than 1,100 mi.

▶ **'Non-Regulation Day'**—Tongue-in-cheek, Gewirtz suggests that Mar. 1 should be declared "Non-Regulation Day" in the air transport industry.

"That's the day everyone will tear up his timetables, disregard his certificates, forget that he has franchise responsibilities and do what business he corporately pleases. Airlines who have filed applications for particular routes will just start flying those routes and not wait on Board action.

"Carriers who have sought for years to eliminate restrictions will just fly over the cities to which they have been restricted. The industry will then abandon service to roughly some 500 of the cities to which it is certificated and operate only between the 50 most profitable pairs of points," he suggests.

If that sounds ridiculous, he says, "it would merely be action on the part of the responsible certificated industry comparable to the existing habits and behavior of the irregulars. . . . We're getting perilously close to the point where that may be the only way to underscore the problem."

▶ **Rebuttal**—L. R. Hackney, executive vice president of the Transport Air Group, Inc., association of airlift and airfreight carriers, replies:

"There is no argument" against "the need of a fully regulated air transport industry if it is to develop on sound economic lines. Members of TAG have long recognized that if they are to become a permanent part of the air transport picture they must be permitted to become a part of the regulated industry."

He calls the "true issue" the allowance of necessary regulatory processes "to work in a normal manner so that all qualified carriers can enjoy full participation in both the economic and defense aspects of the critically essential air transport industry."

▶ **Subsidy Issue**—In answer to charges that the scheduled industry is supported by subsidy, Gewirtz claims that more than 96% of mail flown in domestic operations in 1953 was carried free of subsidy.

Local service lines were subsidized, he says, but "this is not a subsidy to the airlines but a subsidy to that 20% of the population who would not enjoy expedited air service were it not for that government assistance."

Airlines develop revenues for the government, he says, claiming "the government got a better return on its investment in aviation in 1953 than any stockholder in any airline. The government received $2.40 for every $1 it invested, directly or indirectly, in the air transportation system. . . .

"The airlines developed postal revenues. They accounted for the payment of transportation excise taxes. A good many of their profits were drained off by federal income taxes. And, finally, they turned in quite a bit of money via gas and oil taxes and miscellaneous excise revenues. In all, they were responsible for over $340 million in revenues to the federal government."

▶ **TAG Amazed**—Hackney says he is "amazed that ATA, with its years of experience and intimate knowledge of operating costs, could address such an informed group with a straight face and say sincerely that it considered the so-called 45-cent minimum service rate free of subsidy and likewise the 85-cent international service rate free of subsidy.

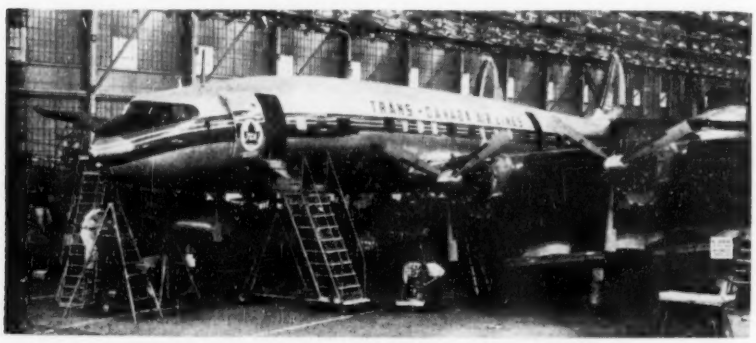
"I am at a loss," he adds, "to understand how an association of ATA's standing can be misled to believe that it costs the airlines 25 cents a ton-mile more to transport airmail over first-class mail by air. ATA's members have accepted the carriage of first-class mail by air at rates ranging from 18.66 cents a ton-mile to 20.04 cents a ton-mile. They also carry cargo at less than 45 cents a tone-mile. Hence, they are either knowingly losing money on cargo or there is subsidy in the 45-cent rate."

▶ **Obstacles Charged**—Hackney charges that "ATA members have placed every legal obstacle in the way of and vigorously blocked every attempt of the air-freight carriers to participate in the very commendable experiment now being undertaken by the Post Office Department in order to provide the taxpayer better service at lower cost."

Stanley Weiss, executive vice-president of the North American Airlines group, says of the Gewirtz address:

"We are amazed that the billion-dollar certificated industry, which has increased 20-fold in the past 15 years, is so frightened by the minimal competition offered by the independent segment of the industry, which he says own only 35 transports, as to advocate continuation of the type of regulation which has denied any applicant in the history of the present act from being authorized to compete over the richest routes in the world with the 'big business' carriers.

"Mr. Gewirtz appears to contend that there is no room for any newcomers in the industry."



First Super Connie for TCA

Here is the first of eight Lockheed Super Constellations for Trans-Canada Air Lines nearing completion at Burbank, Calif. The carrier is scheduled to take delivery on the plane the latter part of this month. Planes will be used domestically and internationally.

Rick to Shift Copter Base, Expand Service

San Francisco—Rick Helicopters is planning to shift its operating base from Los Angeles to San Francisco and build a $250,000-headquarters here for its fleet of 22 Bell 47s.

The company also is preparing to start copter taxi flights in the San Francisco Bay area, inaugurate shuttle service between the airport and downtown district and begin delivering freight and mail to Northern California communities.

These plans are the result of a new agreement that gives Rick a 40-year lease on four and a half acres of land at San Francisco Airport.

Harry W. Mitchell, vice president of subsidiary U. S. Helicopter Service, says the Los Angeles base will be closed and combined with Northern California operations.

Construction of a copter repair base, hangar and offices at the new headquarters site will start as soon as the Art Commission approves Rick's building buildprints, probably within 60 days.

Canada Studies Copter Transport Potential

Toronto—Canadian Air Transport Board has set up a committee to make a long-range exploratory survey of use of helicopters as commercial airlines.

The group will study economics of copter operations by scheduled airlines, factors governing efficient utilization and how the rotary-wing aircraft best can serve Canadian travelers.

It also will cover operations of charter and nonscheduled helicopter transport companies, a business that is growing rapidly in Canada.

The committee is expected to spend at least a year on the survey.

Australian Pilots Ask Higher Pay, Benefits

(McGraw-Hill World News)

Melbourne—Australian Air Pilots Assn. has asked higher wages and improved working conditions for members employed by Qantas Empire Airways and 12 domestic carriers.

The airlines reply that pay boosts would force immediate increases in passenger fares and air cargo rates, resulting in customer resistance that would cause serious losses of revenue.

Salaries of Australian pilots are below standards of U. S. civil aviation and lower than pay scales of several other countries.

Not long ago, pilots employed by government-owned Trans-Australian Airlines won wage increases up to $1,000 a year. But the carrier appealed the raise, and a final decision on the contract still is pending.

Colombian Airports To Cost $14 Million

(McGraw-Hill World News)

Bogota—Nearly $14 million will be spent on new airports authorized by the Colombian government. Another airport, already under construction, will connect the island of San Andres with the mainland. Designed to take four-engine aircraft, it will be opened in mid-1954.

The new fields programmed by the government include:

- **International Airport at Bogota,** to cost $6 million initially with later improvements totaling an additional $4 million. Construction will begin early this year.
- **International Airport at Cali,** costing $3.2 million, will be started early this year.
- **Airport at Barrancabermeja,** an oil industry center, costing $600,000; to be started soon.

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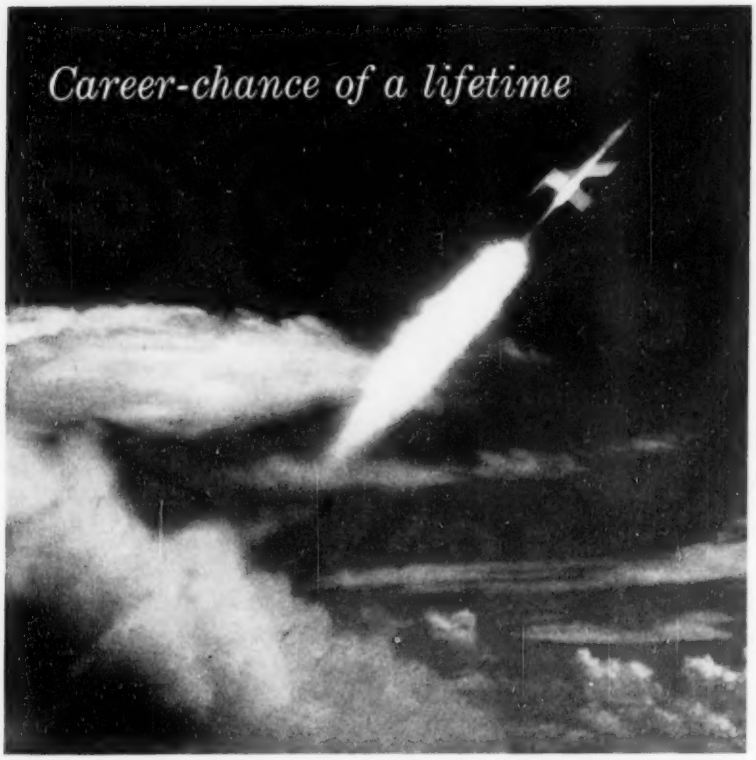

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MISSILE SYSTEMS DIVISION

Sabena Wants HR2S Copter for Paris Route

Sabena Belgian Airlines will not begin regular helicopter service between Paris and Brussels until it can get copters the size of Sikorsky's HR2S (AVIATION WEEK Jan. 25, p. 18) or bigger, a State Department report reveals.

Sabena presently is using the Sikorsky S-55, which it limits to four passengers, on its European routes. However, the run between Paris and Brussels is not economical when operating S-55s, the airline finds.

Its Brussels-Lille, France, flight has been cut from two to one flight daily because of the short days and morning mist that together do not allow sufficient time for double flights.

CAB ORDERS

(Feb. 6-10)

EXEMPTED:

Delta Air Lines to provide free transportation for six months beginning Mar. 15 to technical employes of companies manufacturing Douglas DC-7s.

Aero Finance Corp. and various other carriers from the provision of the Civil Aeronautics Act in order to approve interlocking relationships.

GRANTED:

State of Ohio leave to intervene in the investigation of air service between Charleston, W. Va., and Columbus, Ohio.

San Francisco Chamber of Commerce leave to intervene in the Denver service case.

State of Vermont and Postmaster General leave to intervene in the Northeast and Colonial Airlines case to provide service to Newport, Vt.

American Airlines; Air Line Dispatchers Assn.; Air Line Stewards & Stewardesses Assn., International; Air Line Pilots Assn., International; United Automobile, Aircraft & Agricultural Implement Workers of America; city of Roswell, N. M.; Roswell Chamber of Commerce; Trans-Texas Airways; Trans World Airlines; Delta Air Lines; Eastern Air Lines; United Air Lines; Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express & Station Employes; city of Dallas, Tex.; Dallas Chamber of Commerce; city of Lubbock, Tex., and Lubbock Chamber of Commerce leave to intervene in the Continental and Pioneer Air Lines merger investigation.

DENIED:

Petitions of city of Defiance, Ohio, and its chamber of commerce; city of Bryan, Ohio, and its chamber of commerce; and city of Findlay, Ohio, and its chamber of commerce leave to intervene in Charleston, W. Va.-Columbus, Ohio, air service investigation.

Reconsideration of the Air America enforcement proceeding.

Colonial Airlines petition to reconsider coach fares between Burlington, Vt., and New York, N. Y., or Newark, N. J.

APPROVED:

Interline agreements between Northwest Airlines and Western Air Lines and various other air carriers.

ORDERED:

North Central Airlines to show cause why the Board should not set its mail rates.

Delta Air Lines, Eastern Air Lines and National Airlines to show cause why the Board should not fix rates for transportation of mail between New York, Washington, D. C., and Chicago and Florida.

(Feb. 12-17)

EXEMPTED:

Cordova Airlines from certain segments of the Civil Aeronautics Act to enable it to fly Chitina-Fairbanks, Alaska.

DENIED:

Pan American World Airways request to suspend Boston-Bermuda temporarily.

European-American Airlines request to reopen the trans-Atlantic cargo case.

California Central Airlines application for exemption to carry first-class and other surface mail within California.

GRANTED:

United Air Lines, the Postmaster General, city of Kalamazoo, Mich., and city of Battle Creek, Mich., leave to intervene in the investigation of local service between Chicago and Detroit.

APPROVED:

Pacific Northern Airlines application to suspend service temporarily at Kasilof and Nimilchik, Alaska.

Interline agreements between Northeast Airlines and Mohawk Airlines and various other carriers.

Rate and traffic matters adopted at traffic conference meetings of the International Air Transport Assn. between Pan American World Airways and other carriers.

Consolidation of Southwest Airways Co. and Bonanza Air Lines.

STAYED:

Application of Trans-Texas Airways until Feb. 27 to suspend service temporarily at Del Rio, Eagle Pass and Uvalde, Tex

FIXED:

Final mail rates for Allegheny Airlines, Bonanza Airlines, Central Airlines, Frontier Airlines, Lake Central Airlines, Mohawk Airlines, North Central Airlines, Ozark Airlines, Piedmont Aviation, Pioneer Air Lines, Southern Airways, Southwest Airways Co., Trans-Texas Airways, West Coast Airlines.

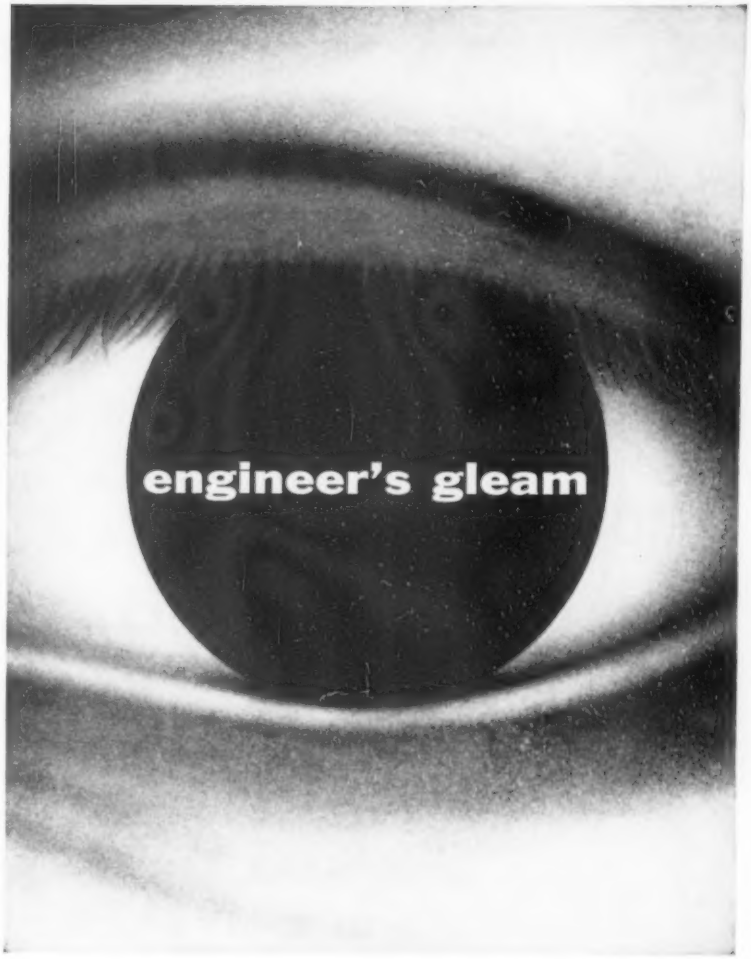
Final mail rates for first-class and other preferential mail for Delta Air Lines, Eastern Air Lines and National Airlines.

DISMISSED:

Proposition of Pan American World Airways for rule providing refunds to Miami-San Juan passengers when high-density equipment is used.

Proceedings in the matter of reduced fares filed by Argonaut Airways Corp. and Quaker City Airways.

Proceedings in the matter of coach fares proposed by Braniff Airways.



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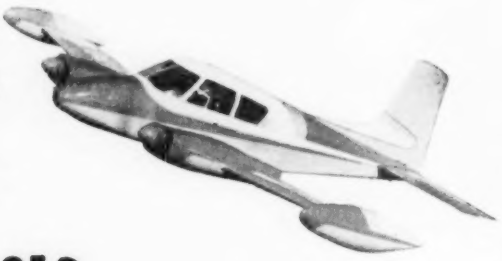

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P-1847, Aviation Week
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EXECUTIVE PILOT — Domestic, Pacific, Atlantic, European, African, Middle East exp. ATR-DC-3 & DC-4 ratings with Beech and A-26 exp. 4 yrs. aviation administrative background. 4 yrs. college-language major. Desire private or corporate position with added responsibilities for challenging foreign opportunity. Age 34 — married — children. PW-1604, Aviation Week.

AIRLINE PILOT, age 33, 8200 hrs. atr DC-3, DC-4, C-46, desires position with foreign based organization. PW-1777, Aviation Week.

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MECHANICAL ENGINEER—4 years experience on Hydraulic controls systems desires position in East or Southeast as sales or application engineer. PW-1828, Aviation Week.

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W-1782, Aviation Week
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FL-1544, Aviation Week
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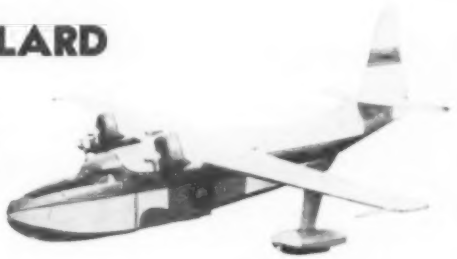

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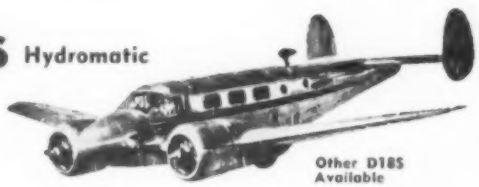

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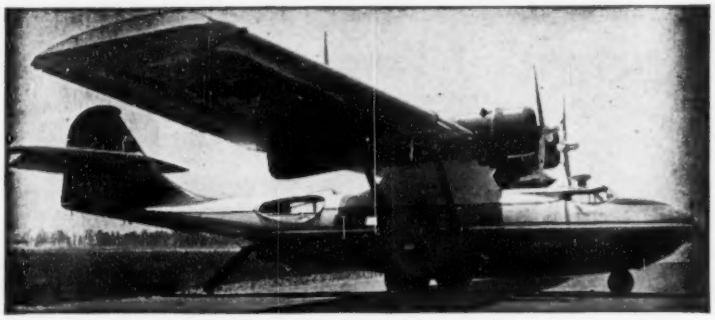

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Description	Mfg.	Part No.	Quan.
Heater	Surface Combustion Co.	83A9	6
Heater	Stewart Warner (200,000 BTU)	921B	230
Blower	Dynamic Air Engine	4582-AA-6C	18
Blower	Joy Manufacturing Co.	U-702-15	24
Tank Unit	Minn. Honeywell	G-1098D	11
Trim Tab Controller	Pioneer	15701-1A	15
Oil Cooler Assembly	U.A.P.	U8416-MM	12
Oil Cooler Assembly	U.A.P.	U8013-MM	14
Hydraulic Pump	Vickers	MF9-713-15H	120
Hydraulic Pump	Vickers	PF12-713-25BCE	124
Hydraulic Pump	Vickers	PF4-713-20BCE	327
Hydraulic Pump/3000 P.S.I.	Vickers	MF45-3911-20Z	43
Hydraulic Cylinder	Air Associates	HC2109	29
Hydraulic Cylinder	Air Associates	HC2110	8
Fire Detector	Edison	117-47	46
Fire Detector	CO_2 Mfg. Co.	ASDC2	65
CO_2 Cylinders	Kidde	981280	185
CO_2 Cylinders	Kidde	M870036B	47
Anti-Icer Pump	Adel	D7818	125
Auxiliary Power Unit	Eclipse	NEP-2	29
Auxiliary Power Unit	Lawrence	LER-30D	16
Pump	Pesco	1E-621	8
Pump	Pesco	2E258SA	21
Separator	Pesco	3V-217-HC	32
Accumulator	Vickers	AA14002A	35
Actuator	Air Associates	M-2031	22
Wobble Pump (D-3)	Erie Meter	AN4014	17
Oxygen Cyl.	Kidde	923748	74

ENGINE ACCESSORIES

Starter	Eclipse	1416-12E	75
Generator	Eclipse (NEA-3A)	716-3A	100
Starter Motor	Jack & Heinz	JH950-R	90
Generator	G.E.	2CM46A2	4
Generator	Eclipse	1003-4	71
Carburetor	Stromberg	PD12K10	550
Carburetor	Stromberg	PR48-A1	236
Carburetor	Holley	1685-HAR	90
Carburetor	Holley	1375-F	19
Magneto	Scintilla	SF9-LN-2	407
Fuel Pump	Pesco	2P248EB	6
Fuel Strainer	U.A.P.	U635A	76
Governor	Woodward	5x18	10
Prop. Reversing Control	Ham. Standard	72400	20
Oil Separator	Eclipse	564-2A	384
Oil Filter	Purolator	27314	100
Pressure Relief Valve	Aerotec	V301B7	20
Tachometer	Eclipse	2227-11-D3A	11
Vacuum Pump	Eclipse	610-2C	6
Spark Plugs	Aero	LS4-AD1	185,000

AIRCRAFT ENGINES & PARTS

Engine	Wright	R-1820-52	1
Engine	Wright	R-1820-54	16
Engine	Wright	R-1820-60	4
Engine	P & W	R-1830-43	1
Bearing	P & W	1045A	166
Flange	P & W	3506	500
Follower Assy	P & W	8288	130
Blower Assy.	P & W	3M814	814
Shaft	P & W	48362	53
Shaft	P & W	48363	75
Gear	P & W	48461	390
Gear	P & W	76936	78
Bearing	P & W	84289	1178
Housing	P & W	84487	113
Nose Housing	P & W	84591C	77
Crankcase Assy.	P & W	84350-D	200
Pump Assy.	Wright Aero	420313	33
Drive Assy.	Wright Aero	416421	46
Q.E.C. Unit		FM1	36

AIRCRAFT ENGINES & PARTS (Cont.)

Description	Mfg.	Part No.	Quan.
Q.E.C. Unit		PY4M(B24	17
Bearing	Torrington	NR6L12	25790
Bearing	Fafnir	AN200-K3L2	18273

GAUGES

Compass	Eclipse	36001-0	20
Gyro Indicator	Eclipse	14601-1F-B1	11
Gyro Indicator	Eclipse	10078-1AG	62
Position Indicator, Wheel & Flap	Weston	AN5780-2	400
Position Indicator, Wheel & Flap	G E.	AN5780-2	1000
Position Indicator, Wheel & Flap	Eclipse	20100-11C-4-A1	23
Pitch Trim Gauge	Eclipse	15100-1B-A1	19
Cowl Flap Indicator	G.E.	8DJ29AAY	21
Oil Temp. Indicator	Lewis	77C3	23
Oil Temp. Indicator	Lewis	77C4	13
Oil Temp. Indicator	Weston	828TY13Z2	71
Manifold Pressure Gauge	Manning, Maxwell & Moore	AN5770-2	28
Fuel Quantity Gauge	Eclipse	3801-3B	128
Dual Carb. Temp. Gauge	Weston	828TY12Z2	40
Carb. Air Temp.	Lewis	77C3	22
Carb. Air Temp.	Weston	11986½	40
Air Temp. Gauge	Weston	727TY70Z2	11
Air Temp. Gauge	Weston	727TY72Z2	85
Air Temp. Gauge	Weston	727TY73Z2	88
Air Temp. Gauge	Weston	727TY74Z2	83
Air Temp. Gauge	Weston	728 40Z2	10
Air Temp. Gauge	Weston	727-TY37P	298
Air Temp. Gauge	Lewis	47B22	33
Air Temp. Gauge	Lewis	47B23	28
Air Temp. Gauge	Lewis	47B24	54
Air Temp. Gauge	Lewis	47B21	30
Cylinde- Head Temp.	Lewis	76819	8
Torque Indicator	Eclipse	20100-45B-14A2	9
Tachometer Indicator	G.E.	8DJ13ABK	6
Tachometer Indicator	Eclipse	2222-1F-2A	200
Magnesyn Pos. Indicator	Eclipse	20000-8-A14	9
Magnesyn Transmitter	Eclipse	20000-43A-13A1	8
Magnesyn Indicator	Eclipse	23000-2A	67
Pressure Transmitter	Eclipse	22101-11-A4	15
Pressure Transmitter	Giannini	47114-D2.0-20	8
Differential Pressure Gauge	Kollsman	906-6-011	22
Differential Pressure Gauge	Kollsman	254BK-6-052	48

AIRCRAFT (RADIO)

Transmitter	Bendix Radio	TA-12B	20
Receiver	Bendix Radio	RA10-DB	35
Amplifier (PB10) W/ED2 Mount	Eclipse	15401-1	10
Amplifier	Eclipse	12086-1C	11
Radio Noise Filter	G.E.	1C-200	740
Radio Noise Filter	G.E.	NF10084	959
Tube		JAN6AL5	327
Standing Wave Ind.	Hewlett Packard	415A	3
Antenna Switch	Bendix Radio	MS49A	26
Control	Bendix Radio	3616	81
Station Box	Bendix Radio	3620	23
Insulator	Bendix Radio	MT48C	518

ELECTRICAL PARTS

Transformer	Eclipse	DW33	11
Transformer	Eclipse	DW28	80
Transformer	Eclipse	DW47	33
Transformer	G.E.	70G3	26
Servo Motor	Transicoil	#1300-20	57
Motor	G.E.	5BA40NJ1A	425
Motor	G.E.	5DP65-MB1	189
Motor	G.E.	5BA25D-J48	44
Motor	Airesearch	86675	25
Motor	Diehl	FD65-5	21
Circuit Breaker	Spencer	PM-5	2094

ELECTRICAL PARTS (Cont.)

Description	Mfg.	Part No.	Quan.
Circuit Breaker	Spencer	C6363-1-5A	115
Circuit Breaker	Spencer	C6363-1-2A	115
Circuit Breaker	Heinemann	AM1614-80	1700
Circuit Breaker	Cutler Hammer	6141-H69A	237
Amplidyne	G.E.	5AM31JJ9A	31
Amplidyne	G.E.	5AM31NJ10	111
Switch	Kidde	A-4614	151
Ignition Switch	Scintilla	AN3213-1	70
Ignition Switch	Nesco	A-9(94-3226)	250
Master Switch	Jos Pollack	M862A	66
Thermo Switch	Fenwall	17322-2	126
Heater Control Switch	White-Rodgers	1033-4E1	287
Air Ram Switch	Minn. Honeywell	PG208AS1	148
Air Ram Switch	Minn. Honeywell	PG208AS7	40
Pressure Switch	Aerotec	M-101-B	20
Pressure Switch	Eclipse	3135-11C	88
Impact Switch	Kidde	SA/3A	18
Switch	C.H.	8909-K99	2000
Dome Light	Grimes	AN3096-4	2585
Dome Light	Grimes	AN3096-5	775
Dome Light	Grimes	AN3096-6	1365
Plug	Cannon	NAF310310-4B	2747
Plug	Cannon	NAF310310-5B	402
Relay	Leach	7264-404	47
Relay	Leach	7210	24
Relay	Allied	BO8X-2	31
Relay	Square D	82A	718
Relay	G.E.	CR2791-G100-K4	281
Relay	G.E.	CR2792F101-A3	626
Relay	Guardian	G34464	41
Relay	Guardian	G31502-A	350
Relay	C. P. Clare	D2060	45
Control Box	Vapor Car Heating Co.	9804B	34
Compensator	Vapor Car Heating Co.	46B311	25
Solenoid	Interstate Aircraft & Eng. Co.	A812	202
Flex. Cable	Airesearch	25432	66
Temp. Control	Fulton Syphon	715E	52
Noise Filter	Mallory	NF3-5	500
Regulator	G.E.	3G8D1A18A	13

VALVES

Valve	Kidde	982585	386
Valve	Oh. Chem.	AN-60009-1B	325
Valve (3000 PSI)	Parker	2-1046-76	47
Restrictor Valve	Parker	SP4-2746-77	68
Restrictor Valve	Parker	SP4-2746-78	105
Restrictor Valve	Parker	SP4-2746-79	40
Restrictor Valve	Parker	SP4-2746-80	48
Restrictor Valve	Parker	SP4-2746-81	60
Restrictor Valve	Parker	SP4-2746-76	142
Restrictor Valve	Adel	18784	33
Cone Check Valve	Parker	PL2-2546-75	127
Cone Check Valve	Parker	PL2-2546-76	123
Cone Check Valve	Parker	PL2-2546-77	670
Cone Check Valve	Parker	PL2-2546-78	540
Check Valve	Parker	PLY-843-54	112
Check Valve	Parker	PL2-1846-77	23
Check Valve	Kenyon	19100-2-101B	67
Check Valve	Ecl...	557-5	9
Check Valve	U S ... auge	AW-CV-1-1	180
Valve	Parke	6-746-10	68
Valve	Vicker	AA31400	28
Restrictor Valve	Adel	18784	33
Lock Valve	Adel	12924-2	85
Brake Valve	Vickers	146102	22
Selector Valve	Parker	SP-1-445-8	7
Selector Valve	Adel	D9530	478
Selector Valve	Adel	D9530-2	668
Selector Valve	Adel	D9560-2	428
Selector Valve	Adel	D9632	179
Selector Valve	Adel	D9696	237
Selector Valve	Adel	D10044	744
Selector Valve	Adel	D10051	244
Solenoid Valve	United	37D6210 (AN4078-1)	2900
Magnetic Valve	General Control	AV1B1174	114
Throttling Valve		73-A-01	1865
Relief Valve	Airex	1965-900	248
Pressure Relief Valve	Aerotec	V301B7	20
Valve	Aero Supply	74247 (TyPH3)	814
Valve	Whittaker	AN5830-1	335
Valve	Whittaker	AN5830-6	74
Valve	Parker	AN5831-1	60
Valve	Eclipse	612-4A	130
Valve	Kohler	K1593-6D	1888
Valve (0-500PSI)	Bendix	146102	46

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► **British Overseas Airways Corp.** reports trans-Atlantic passenger traffic increased 29.3% during January over the same month last year, and airfreight climbed 20.5%.

► **El Al Israel Airlines** will set up a regular Lydda-Dusseldorf route to handle German reparations goods if the service, now under study by the Ministry of Communications at Tel Aviv, is approved by the two governments.

► **KLM Royal Dutch Airlines** is scheduled to inaugurate weekly New York-Stuttgart, Germany, aircoach flights Apr. 11.

► **Misrair** has inaugurated twice-weekly Tripoli-Cairo scheduled service, expects to extend the route to Tunis in the near future.

► **North Central Airlines** was scheduled to begin flying DC-3 commuter service Mar. 1 twice daily from Green Bay and Oshkosh, Wis., to Milwaukee and Chicago and a second roundtrip Manitowoc-Milwaukee-Chicago commuter flight.

► **Northeast Airlines** has taken delivery on the first of four Convair 240s purchased from Pan American World Airways, is scheduled to receive its second next month.

► **Pan American World Airways** will carry students from San Francisco State College on an eight-week, round-the-world flight next summer under a plan that sets up the tour as a credit-earning course.

► **Pioneer Air Lines** had a 46% load factor on flights in Texas and New Mexico during January, highest for that month in the carrier's history.

► **Scandinavian Airlines System** carried 44,446 passengers on 1,312 North Atlantic flights in 1953, compared with 29,884 persons and 996 trips the preceding year. . . . SAS has increased and reorganized its Seattle staff to handle the "increasing market in the Pacific Northwest."

► **Trans World Airlines** expects to fly more than 600 million passenger-miles on overseas routes this year, an increase of better than 457% over its first year of international operations in 1946.

► **United Air Lines** will inaugurate 72-passenger DC-6 aircoach flights Mar. 25 from Washington, D. C., to Chicago and major West Coast cities. . . . UAL operated 212,205,000 revenue passenger-miles in January, setting a company record and increasing 17% over the same month of 1953.

Coming Events Cast Their Shadows . . . ?

Latest view of Sabena Belgian Airlines heliport located at the Allee Verte Station, Brussels, believed to be Europe's oldest railway terminal which closed its doors Jan. 17. A Sabena seven-passenger Sikorsky S-55 is seen ready to take off. Last Sept. 1, the airline inaugurated the world's first international scheduled passenger copter service from this heliport. Its four-copter fleet flies daily over a 1,600-mi. network linking Lille, France; Antwerp and Liege, Belgium; Rotterdam and Maastricht, Holland and Cologne and Bonn, Germany. The Brussels heliport is the hub of these services.

AVIATION CALENDAR

Mar. 5-7—Society of Women Engineers, national convention, Mayflower Hotel, Washington, D. C.

Mar. 22-25—Institute of Radio Engineers, national convention, Waldorf-Astoria Hotel and Kingsbridge Armory, New York.

Mar. 29-31—Aero Medical Assn., 25th annual meeting, Statler Hotel, Washington, D. C.

Apr. 5-6—Society of the Plastics Industry (Canada), Inc., 12th annual conference, Mount Royal Hotel, Montreal.

Apr. 5-7—National Fluid Power Assn., first annual meeting, Edgewater Gulf Hotel, Edgewater Park, Miss.

Apr. 5-8—American Management Assn., 23rd National Packaging Exposition, Convention Hall, Atlantic City, N. J.

Apr. 12—Society of Automotive Engineers, second annual Aeronautic Production Forum, Hotel Statler, New York.

Apr. 14—National Advisory Committee for Aeronautics, symposium on helicopter research for American Helicopter Society, Langley Field, Va.

Apr. 14-16—Society for Experimental Stress Analysis, spring meeting, Netherlands Plaza Hotel, Cincinnati.

Apr. 19-20—Symposium on automatic production of electronic equipment, sponsored jointly by Stanford Research Institute and USAF, Fairmont Hotel, San Francisco.

Apr. 21-24—Second annual student paper competition for undergraduates and graduates, sponsored by Institute of the Aeronautical Sciences (Texas Section), Adolphus Hotel, Dallas.

Apr. 22-23—Joint meeting of Radio Technical Commission for Aeronautics, Franklin Institute Laboratories, Institute of the Aeronautical Sciences (Philadelphia Section) and Institute of Radio Engineers (Philadelphia Section), Franklin Institute, Philadelphia.

Apr. 22-23—American Institute of Electrical Engineers, conference on feedback control, Claridge Hotel, Atlantic City, N. J.

Apr. 29-30—American Society of Tool Engineers, 10th biennial industrial exposition, Convention Center, Philadelphia.

May 3—Invention Exhibit & Conference, Cleveland Engineering Society building, Cleveland.

May 4-6—1954 Electronic Components Symposium, Department of Interior auditorium, Washington, D. C.

May 5-7—Third International Aviation Trade Show, managed by Aircraft Trade Shows, Inc., 71st Regiment Armory, New York.

May 5-7—American Welding Society, second Welding & Allied Industry Exposition, Memorial Auditorium, Buffalo, N.Y.

May 16-19—American Association of Airport Executives, national convention, Louisville, Ky.

May 17-20—Basic Materials Conference, produced by Clapp & Poliak, Inc., International Amphitheater, Chicago.

June 14-19, 21-23—Two courses in automatic control, University of Michigan, College of Engineering, Ann Arbor. Registration deadline: Apr. 15.

June 21-24—Institute of the Aeronautical Sciences, annual summer meeting, IAS Building, Los Angeles.

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AVIATION WEEK—MARCH 1, 1954

ADEL DIV., GENERAL METALS CORP. 38
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AIRBORNE ACCESSORIES CORP. 8
Agency—Gray & Rogers Adv.
AIRCRAFT RADIO CORP. 6
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Agency—Parker Willson Adv.
AMERICAN ELECTRONIC MFG., INC. 45
Agency—Clyde D. Graham Adv.
AMERICAN NON-GRAN BRONZE CO. 77
Agency—Norman P. Hewitt Adv.

BENDIX PRODUCTS DIV., BENDIX AVIATION CORP. ..... Third Cover
Agency—MacManus, John & Adams, Inc.
BURNS AERO SEAT CO., INC. 52
Agency—Buchanan & Co., Inc.

CONSOLIDATED VULTEE AIRCRAFT CORP. 19
Agency—Buchanan & Co., Inc.
CONSOLIDATED VULTEE AIRCRAFT CORP. 60
Agency—Thomas L. Yates Adv.
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Agency—George Homer Martin Assoc.

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Agency—Clayton F. Bane Adv.

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Agency—Horton Noyes Co.
FAIRCHILD ENGINE & AIRPLANE CORP. 57, 81
Agency—Gaynor & Co., Inc.
FOOTE BROS. GEAR & MACHINE CORP. ..... Fourth Cover
Agency—The Buchen Company

GENERAL ELECTRIC CO. 38, 39
Agency—G. M. Basford Co.
GOODYEAR TIRE & RUBBER CO. ..... Front Cover
Agency—Kudner Agency, Inc.

HAYDON CO., A. W. 46
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Agency—Foote, Cone & Belding

LEARCAL DIV., LEAR, INC. 47
Agency—Buchanan & Co., Inc.
LOCKHEED AIRCRAFT CORP. 68
Agency—Hal Stebbins Adv.

McGRAW-HILL BOOK CO. 58
MECHANEERS, INC. 55

NEW DEPARTURE DIV., G.M.C. 31
Agency—D. P. Brother & Co., Inc.
NORTH AMERICAN AVIATION, INC. 5
Agency—Batten, Barton, Durstine & Osborn, Inc.

OHIO SEAMLESS TUBE CO. 49
Agency—Howard Swink Adv. Agency
OMOHUNDRO CO., PAUL 20
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Agency—Henri-Hurst & McDonald, Inc.

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PESCO PRODUCTS CO. 61
Agency—The Jayme Organization, Inc.
PROTO TOOLS 4
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REVERE CORP. OF AMERICA 27
Agency—Troland, Inc.
RYAN AERONAUTICAL CORP. 34
Agency—Batten, Barton, Durstine & Osborn, Inc.

SEARCHLIGHT SECTION 69, 70, 71, 72, 73, 74, 75
SNAP-ON-TOOLS CORP. 50
Agency—The Cramer-Krasselt Co.
SOLAR AIRCRAFT CO. 6
Agency—The Phillips-Ramsey Co.
SPRAGUE ELECTRIC CO. 32
Agency—The Harry P. Bridge Co.
STANPAT 26

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Agency—Taylor-Norsworthy, Inc.
THERMO ELECTRIC CO. 42
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Agency—Batten, Barton, Durstine & Osborn, Inc.
TITEFLEX, INC. 43
Agency—John Falkner Arndt & Co.

WHITTAKER CO., LTD., WM. R. 28
Agency—Mogge-Privett, Inc.

ZENITH PLASTICS CO. ..... Second Cover
Agency—Francis D. Gonda Co.

SEARCHLIGHT SECTION

(Classified Advertising)

H. E. Hilty, Mgr.

EMPLOYMENT
Positions Vacant 69-72
Positions Wanted 72
BUSINESS OPPORTUNITIES
Offered 73
Wanted 73
PROPERTY
For Rent 73
PLANES—EQUIPMENT
(Used or Surplus New)
For Sale 73-75
WANTED
Planes—Equipment 72, 73

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EDITORIAL

Those Russian Pictures

As noted elsewhere in today's issue, highest officials of the Eisenhower Administration are studying the implications to this country of the two photographs published by AVIATION WEEK Feb. 15, showing two Russian turboprop intercontinental bombers.

The photographs and negatives were turned over to Air Force public relations and intelligence officers before publication, and have been subject of closest study in the Pentagon and at Wright Field.

United Press questioned the Air Force about the pictures before filing them on the telephoto wires, with accompanying story, to its several hundred newspapers. The UP was told by an Air Force spokesman, "We are happy to have the pictures and are very much interested in them." The Associated Press, which also filed a story and the pictures to its hundreds of clients, reported: "Pentagon officials were known to be keenly interested in the photographs. . . ."

The pictures were published by nearly all morning newspapers in the country Feb. 15, with stories or captions quoting this magazine. Time magazine devoted an entire page to the illustrations, and Newsweek used a spread dominating a page.

An amusing sidelight comment came from a disgruntled aviation publication four days later—although it is a daily—which quoted us incorrectly again to make its point. After "scoffing" at Russian aircraft developments during the past few years, it said, we finally discovered the Russian air force with purported photos, etc. It also said its sister publication had published descriptions of these planes last August.

Those who read us more carefully than our competitors know we have been careful not to overestimate or underestimate the Russians, and for that reason we refused to print all of the "information" we have been offered because we doubted the authenticity of some of it. We have scoffed at much Russian "dope" but never at the Russians, about whom we—and so many others—know so little. If high officials of our government had been any more convinced than we were of the authenticity of those descriptions that were published last August, the descriptions would have received thoughtful consideration of the top officials of the government, and of our senators and congressmen. In which case it is inconceivable that the AVIATION WEEK pictures would have caused such a sensation the following February!

Wanted: Millions of First Flighters

Why should anyone take a rail coach from coast to coast these days? This question is difficult to answer for one who has tested any of the current aircoach services.

On a trip to Los Angeles on a recent Monday, to speak before the aviation committee of the chamber of commerce, we gave one of American Airlines' transcontinental DC-6 coach flights a trial, even to the box lunch at Chicago. It's good service and a man-sized bargain.

Our takeoff was from La Guardia about 9:20 a.m. There was a stop-off at Chicago, where American sold its box lunches for $1.25 apiece, put up by the airline's restaurant subsidiary, Sky Chefs. We flew from Chicago to Los Angeles nonstop, in cloudless skies, over Omaha, Denver, Grand Junction, Bryce Canyon, and Las Vegas. The mountains were magnificent, and the passengers enjoyed the scenery and the pilot's commentary. We landed at L. A. International Airport about 30 minutes ahead of schedule—with 52 other passengers in an 80-passenger plane, in something like 10 hours, 20 minutes—at about 4:40 p.m. local time. Tax brought the $99 fare to $113.85. Incidental expenses were less than $5—the box lunch, airport bus fare at each terminal, tips and reading matter.

What is the best the railroads offer their coach customers? A phone call, with this question, brought these statistics from the information clerk at New York's Penn Station: We could have left New York on the Pennsylvania at 2:50 p.m. that same Monday. We'd have changed trains and stations at Chicago next morning. There is still no through coach service for coast-to-coast rail passengers! There would have been a layover of an hour and 40 minutes before leaving Chicago on the Santa Fe Chief, which would have brought us into Los Angeles at 10:30 local time Wednesday night. The fare would have been $92.79, including tax. There would have been seven meals purchased en route, terminal transportation, and perhaps some tips. And the difference in time saved should mean something even to coach travelers. These are homely facts but they paint a devastating picture to air's competitors.

The amazing fact is that the average citizen still does not realize that such air service is so easily and economically available. Even some of our friends in aviation registered surprise that we would take an aircoach. "Wasn't it rugged?" one asked. Obviously it wasn't.

The railroads are capitalizing on the airlines' failure to get the facts of modern air travel to the masses of people. How much longer are they going to get away with it?

In our opinion, scheduled aircoach is not being promoted as aggressively as it deserves. We hope it is not because the airlines are more fearful of losing first-class passengers, to their own coaches (a difference of $59.85 per coast-to-coast passenger) than they are interested in capturing new customers from the surface carriers, at $99 apiece. We still need first riders in this business—millions of them. They'll never become steady customers till they make that first flight.

—Robert H. Wood

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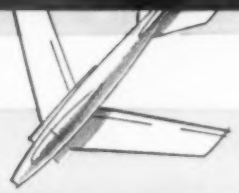

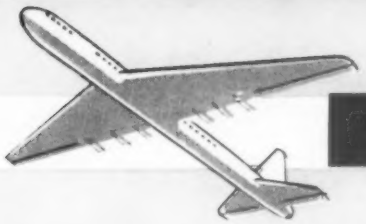

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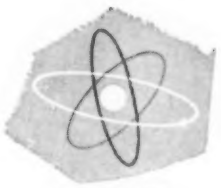

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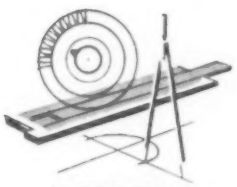
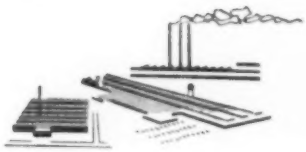


ENGINEERING



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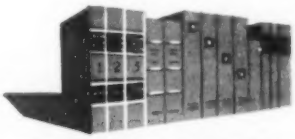

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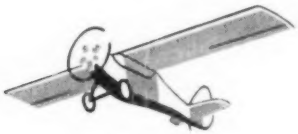
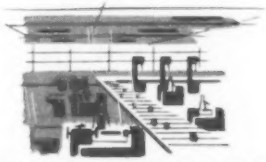


PREVIOUS ACCOMPLISHMENTS



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